ATTO Technology, Inc.

FastStream VT 5300

Installation and Operation Manual

Fibre Channel to SCSI Virtual Tape Appliance

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1.0 ATTO FastStream VT 5300 increases reliability

The ATTO FastStream™ Virtual Tape 5300 Appliance is a mid-range storage solution that emulates a tape library for fast backups on demand and error-free restores of critical data.

The ATTO FastStream Virtual Tape 5300 is seen by system applications as a conventional tape library, allowing you to use existing disk-based storage as if it were tape.

The ATTO FastStream VT 5300 delivers immediate performance improvements to backup, restore and archive applications.

Adding a disk-based Virtual Tape Library (VTL) ensures high speed access to your data. The FastStream VT can be seamlessly integrated into existing storage environments as if it were a traditional tape library. The ATTO FastStream VT 5300 also provides high performance RAID parity protection to existing disk-based storage without regard to manufacturer, type of drive, capacity or speed.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

The ATTO FastStream VT 5300 is available in 1U industry-standard rack mount enclosure.

Hardware features

- 2 independent 4-Gigabit Fibre Channel Host Interfaces to integrate existing direct attached storage into a high performance SAN environment
- 2 Ultra320 SCSI device high speed connections backward compatible with Ultra160 devices
- O/S and platform independent. 64 bit OS supported
- RoHS compliant

Virtual Tape features

- Seen by ISV applications as a conventional tape library.
- Configure one or two Virtual Tape libraries
- Configure up to 30 Virtual Tape drives and 256 Virtual tapes for each library.
- Hardware RAID Level 0, RAID Level 1, RAID Level 5, RAID Level 10 and JBOD, all user configurable

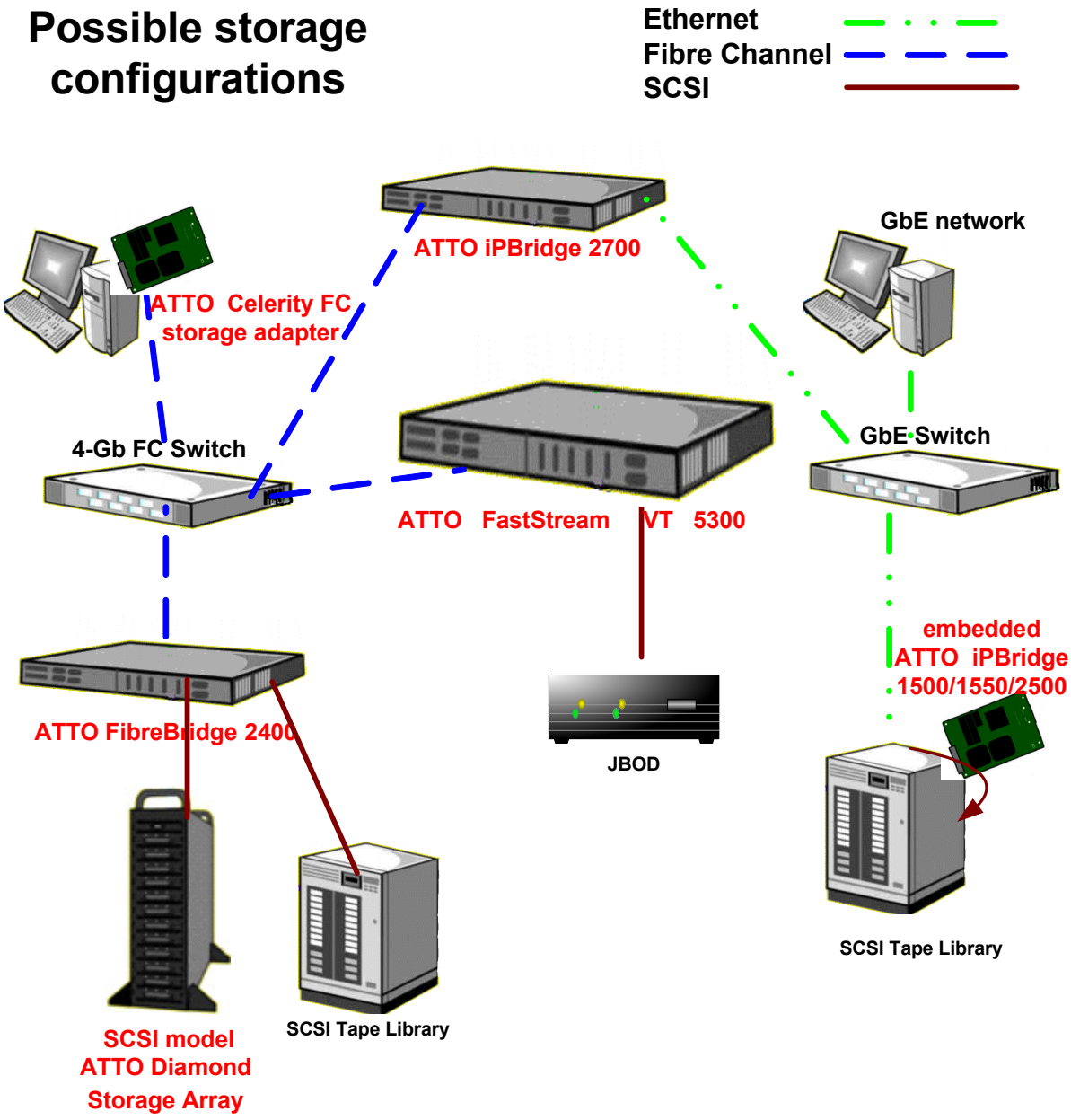
Backup and restore features

- Performs up to 30 concurrent backups for each Virtual Tape Library (VTL)
- ATTO SpeedWrite™ feature ensures responsive and error-free backup in the shortest possible time
- Backup and restore data at up to 1.89 TB per hour
- Uses reliable disk storage to take the place of conventional tape to deliver immediate performance improvements to backup and restore applications

Management and control features

- The ATTO ExpressNAV™ interface, a browser-based GUI simplifies configuration, management and navigation
- Field updateable firmware with the ability to save configuration settings for easy field replacement
- Automatic rebuild of RAID groups and Rebuild Priority keep the system operational if a drive fails
- Global Hot Spares ensure continuous operation if a drive fails. The Hot Spare automatically comes on-line and rebuild starts if a disk failure is detected
- ECC Protected Memory assures data integrity and continued up time by implementing Error Correcting Checksum (ECC) and Parity checks on all data paths. Potential corruption cannot go undetected
- Phone Home error notification automatically generates an E-mail alert in the event of a failure
- Drive initialization and verification identifies attached drives which exhibit poor performance or soft failures
- Capable of measuring performance during normal operation and during the drive initialization process

Possible storage configurations



1.1 Physical attributes

The ATTO FastStream VT 5300 is a Fibre Channel to SCSI virtual tape appliance which can be seamlessly integrated into an existing storage environment.

The ATTO FastStream VT 5300 is available in an industry-standard 1U form factor for easy integration into racks. It supports next-generation media and, as a result, is equipped to handle the throughputs needed by advanced disk technologies.

Dimensions

Width: 17 inches

Length: 8.94 inches

Height: 1.7 inches (1U)

Weight: approximately 8 pounds

Cooling and airflow

Operating Temperature: 0°-40° C external
Humidity: 10-90% non-condensing
Airflow: air enters through slots on the right of the rear panel and exits through slots on the left of the rear panel.

CAUTION

Do not block the enclosure's vents. The FastStream VT 5300 shuts down if overheating occurs.

Power

The power supply circuit is permanently mounted within the enclosure and is not hot swappable. It has one standard IEC320 power receptacle and switch. The power requirements of the ATTO FastStream VT 5300 plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.
Input voltage: 10/230V AC, with operating input range of 90-132V AC or 175-264V AC, 47-63Hz, single phase. The AC input range selection is automatic with no manual or jumper switchover required.
Power draw: 2 amps at 110V, 1.6 amps @ 90V

Fibre Channel ports

The two independent 4-Gigabit Fibre Channel ports can connect the FastStream VT 5300 to either a Fibre Channel Fabric or Fibre Channel Arbitrated Loop using Small Formfactor Pluggable (SFP) interface.

SCSI ports

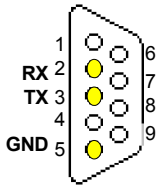
The two SCSI ports connect storage devices into the Fibre Channel Storage Area Network (SAN). Each port is totally independent from the other.
The ports are Ultra 320 SCSI busses with VHDCI connector, downward compatible with all forms of single-ended SCSI and all previous SCSI protocols.

Ethernet port

The 10/100 Base T Ethernet port is accessible from the RJ45 connector. Local diagnostics are supported through an integrated web server (ATTO FastStream VT 5300 browser-based user interface), CLI, Telnet and FTP. Includes support for DHCP, Telnet, FTP, SNMP and ICMP.

Serial port

The RS-232 serial port provides support for remote monitoring and management using a DB9 connector. The baud rate is programmable and preset at the factory to 115200 bps.



LED indicators

The LED indicators can be viewed from the connector side and the front side of the FastStream VT 5300. (See Exhibit 1.1)
LEDs on the connector side are:
A bicolor Ready/Fault LED lights green to indicate ready, lights yellow to show a faulted condition, and is off to indicate not ready.
Embedded in the Ethernet port connector: a lighted green LED shows a valid link; off indicates that no link is present. A separate blinking yellow LED indicates activity.
Fibre Channel port: A lighted green LED indicates link; off means no link. A separate green LED indicates activity if it is lit, no activity if it is off.
SCSI ports: A green LED on each port indicates activity if is lit.
LEDs on the faceplate are:
A bicolor Ready/Fault LED is lighted green to indicate ready, lighted yellow to show a faulted condition, and off indicates not ready.
SCSI ports: A green LED on each port indicates activity if is lit.

Fibre Channel ports: bicolor LED indicates FC speed. If it is off, speed is 1-Gb; if it is green, 2-Gb, and yellow indicates 4-Gb FC. A separate green LED indicates activity if it is lit, no activity if it is off.

Exhibit 1.1-1 FastStream VT 5300 front panel LEDs.

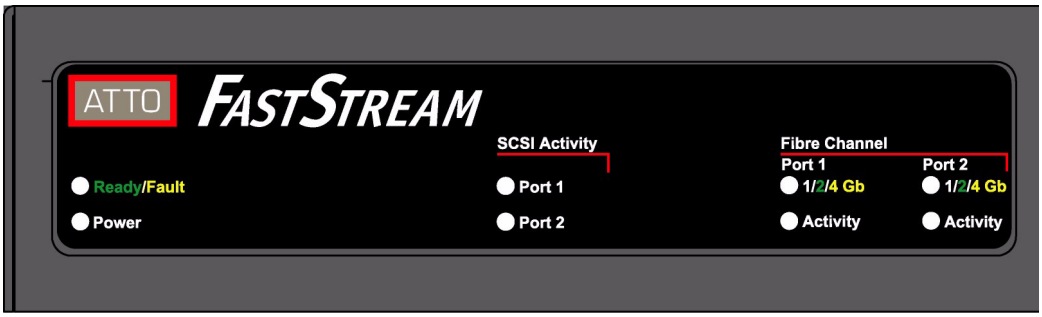
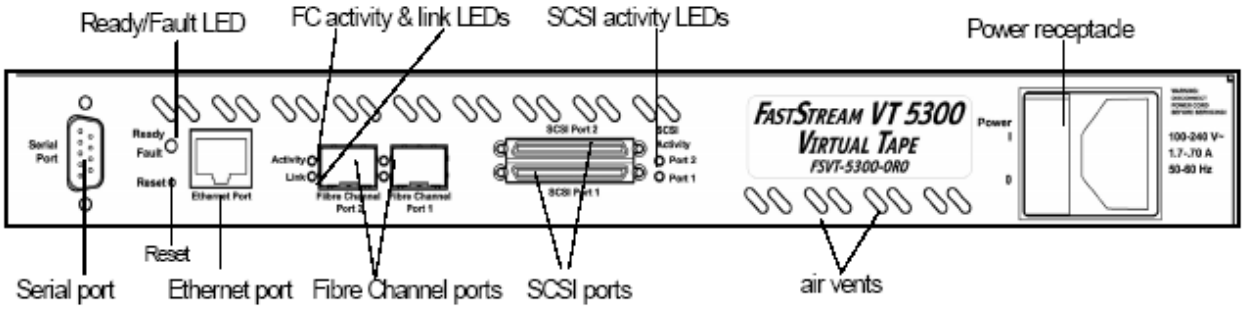


Exhibit 1.1-2 Connectors, LEDs and power receptacle



2.0 Installation

If you have not already completed the instructions on the Quick Start page packed with your FastStream VT, use the following instructions to install the FastStream VT.

Unpack the packing box; verify contents

- The FastStream. Note the serial number of your FastStream unit: _____
- Power cord
- “L” brackets for mounting in a 19” rack
- CD which includes the Firmware, Installation and Operation Manual, QuickNAV IP discovery program and system drivers

Install the FastStream

1 Place the FastStream VT on a stable flat surface or install it into a standard rack. If installing into a rack (see Exhibit 2.0-1):
   a. Attach “L” brackets so that the front side with the LEDs face front and the connector side is at the back.
   b. Install the FastStream horizontally within the rack so it does not reduce the air flow within the rack.
2 Connect the FastStream Fibre Channel ports to your SAN using SFPs and multimode fiber optic cables. Keep cable lengths as short as possible to ensure the highest signal quality and performance. For details, refer to Cabling on page iii of the Appendix.
3 Connect SCSI storage devices to the FastStream SCSI ports. For details, refer to Cabling on page iii of the Appendix.
4 Power up the SCSI devices
5 Connect the Ethernet port to your network. For details, refer to Cabling on page iii of the Appendix.
6 Connect the AC power cord from the FastStream to the proper AC source outlet. If you are using a rack:
   a. Properly ground the FastStream to the rack equipment. The earth ground connection must be maintained.
   b. The power requirements plus the power draw of the other equipment in the rack must not overload the supply circuit and/or wiring of the rack.
7 Use the power switch and switch on power to the FastStream
8 Wait up to two minutes for the FastStream Ready LED to light indicating the FastStream has completed its power-on self test sequence.
9 Windows® users continue to Install Windows drivers ; Mac® users continue to Discover the IP address

Install Windows drivers

1 Windows automatically detects the FastStream and ask for the driver in the **Add Hardware** wizard. Select **Install from a list or specific location**
2 Click **Next**
3 Choose **Don’t Search**
4 Click **Next**
5 Choose **Have disk**
6 The VT media changer and the VT tape have separate driver files. Repeat the following steps for each driver.
   a. Specify the driver as found in the **VTMediaChanger** or **VTTapeDrive** folder in the setup CD. The files are in a folder based on your operating system: Win2K drivers for Windows 2000 and Windows XP; Win2K3 drivers for all 2003 Server products.

Note

Use the files directly from the CD or copy them onto a floppy or to a local directory on your hard drive.

   b. Follow the remaining instructions to complete the installation procedure.
7 After the driver for each device is installed, the tape drive is listed under **Tape Drives** and the VT media changer is listed under **Media Changer** in the **System Devices** folder.

Discover the IP address

Note

The FastStream VT is initially configured with DHCP enabled. It is best if you have access to a DHCP server.

1 Work from the computer attached to the FastStream VT Ethernet port on the same broadcast domain. From the CD supplied with your FastStream, run the QuickNav Utility **QuickNAV-windows.exe** for Windows or **QuickNAV-Mac** for Mac OS X.

2 Locate the FastStream with the serial number recorded earlier.
3 Highlight the serial number.
4 Click **Next**.
If a DHCP server is available on your network, an address is assigned automatically by the server. Note the assigned address:

_____

If you do not have a DHCP server, get an IPaddress and subnet mask from your network administrator, type it into the area provided, and select **Next**.

5 Click on **Launch Browser**
Your browser points to the FastStream VT splash screen. If you use Internet Explorer as a browser, continue on to Internet Explorer setup below. If not, continue on to Begin initial configuration .

Internet Explorer setup

1 Open your browser
2 Select **Internet Options**.
3 In the **Internet Options** screen, select the **Security** tab.
4 Click on the **Trusted Sites** icon.
5 Click on the **Sites** button.
6 In the text box **Add this Web site to the zone**, add the IP address of the appliance. You may use wild cards.
7 Click on **Add**
8 Uncheck the **Require server verification** check box.
9 Click **OK.**
10 At the bottom of the **Internet Options** box, click on **OK** and close the box.

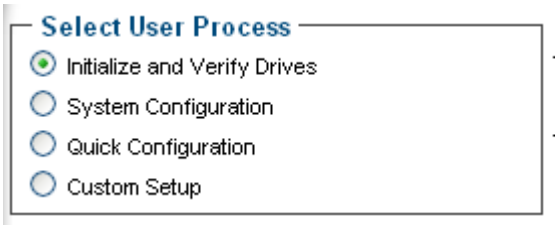
Begin initial configuration

1 The ExpressNAV interface welcome screen appears. Click on **Enter Here**
2 Type in the user name and password.

Note

*The default user name is **root;** it is case insensitive. The default password is **Password**; it is case sensitive. It is best practice to change the passwords. Refer to Optional system modifications on page 13.*

3 The **Initial Setup** page appears.



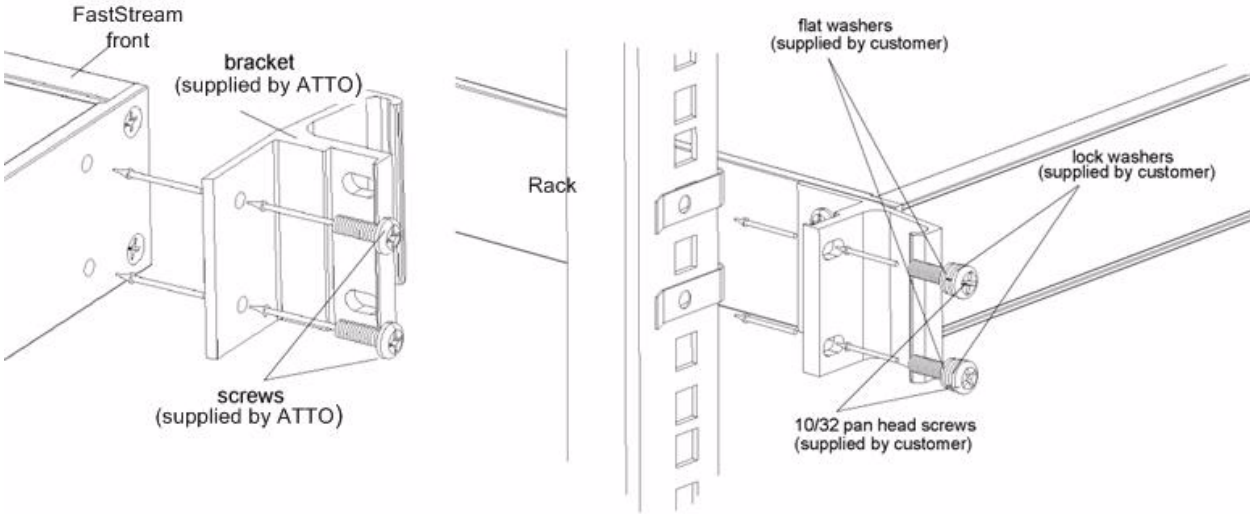
Before creating a Virtual Tape Library, you may wish to initialize and verify your drives to ensure drive integrity. Refer to Initialize and verify drives on page 7.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

4 Go on to Configure Virtual Tape on page 7.

Exhibit 2.0-1 General bracket assembly



2.1 Configure Virtual Tape

The ATTO FastStream VT allows configuration of storage into one or two JBOD, RAID Level 0, RAID Level 1, RAID Level 10 or RAID Level 5 Virtual Tape Libraries (VTL).

The FastStream VT appears to hosts as a tape library, allowing ISV packages to issue a set of tape library commands to perform backup and restore operations to the FastStream.

The FastStream VT configures your storage into one or two Virtual Tape Libraries (VTL) depending on the choices you make.

For every Virtual Tape Library created on the FastStream VT, an underlying RAID Group is created from the selected drives to provide the physical storage medium for the Virtual Tape cartridges.

You may either use the **Quick Configuration** or **Custom Setup**.

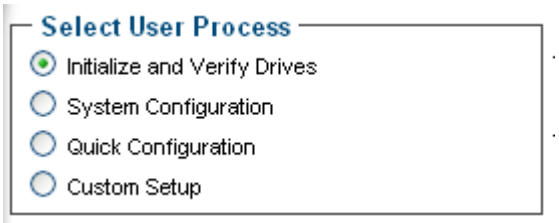
- **Quick Configuration**: quickly generates a Virtual Tape Library after you answer a few key questions. The procedure uses all attached SCSI disks to build a single VTL. If you want to initially create more than one VTL, use custom setup. You may modify this configuration after initial setup.
- **Custom Setup**: allows you to configure the FastStream VT to best suit the needs, performance and level of reliability for your application. If you want to initially create more than one VTL, use custom setup.

You may change the configuration later, however, changing configuration erases data and may affect performance. Backup all previously stored data and plan carefully. Read all information and warnings.

CAUTION

Selecting Commit during configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up.

Before beginning these procedures ensure drives are reliable by initializing and verifying the drives in your system.



Initialize and verify drives

Before creating any VTL, initialize and verify your drives to ensure integrity. When selected, the FastStream VT writes a pattern to the entire drive.

CAUTION

Selecting Drive Initialization causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before initializing drives.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 From the **Initial Setup** page, choose **Initialize and Verify Drives**.

3 Click **Next**

4 Select **Initialize and Verify**

5 All eligible drives are highlighted in green; the system only initializes highlighted drives. Ensure only the drives you are initializing are selected. Click **Commit**

CAUTION

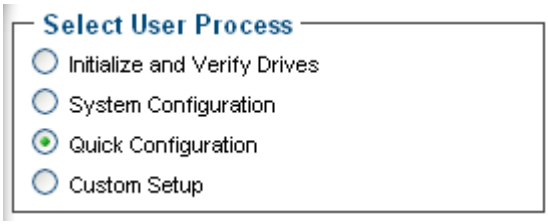
Do not restart the FastStream or disconnect or power cycle drives during drive initialization and verification or you must start the verification process from the beginning.

Use quick initial configuration

Quick Configuration generates a Virtual Tape Library after you answer a few key questions. The procedure uses all attached disks to build a single VTL. If you want to initially create more than one VTL, use **Custom Setup**. (Refer to Use custom setup on page 10). You may modify this configuration after initial setup.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 From the **Initial Setup** page, choose **Quick Configuration**.



The FastStream scans your system for devices; the **Quick Configuration** page appears. The number of devices and the total amount of storage on those devices is displayed.

3 In **Step 1** on the screen, type in a name for your Virtual Tape Library. Names may be up to 14 characters and may not contain any spaces.

4 Answer the questions in **Step 2** based on the needs of your software vendor.

- If your storage is RAID protected, the FastStream does not reconfigure it. If it is not, the FastStream sets the RAID level.
- Select the number of simultaneous backups you wish to run, from 1 to 30.
- Click in the box if you want a Hot Spare (refer to Use Hot Spares on page 11.) The FastStream rescans the system to recalculate capacity.

5 Select **Next**

6 The **VTL Setup Summary** page appears. If the configuration is the way you want it, click **Commit**. A warning box appears.

Note

*Clicking on **Cancel** takes you to the **Monitor VTL** screen. You can choose to begin this procedure again by following the directions in Step 2 of Use custom setup on page 10 or, to get back to the **Quick Initial Configuration** page, exit out of ExpressNAV and restart the process at Step 1 of the Use quick initial configuration procedure.*

7 In the warning box, verify that you want to add the VTL by clicking on **Yes**.

Note

*Clicking on **No** returns you to the **Virtual Tape Library Setup** page and you can choose to begin this procedure again by following the directions in Step 2 of Use custom setup on page 10. Or, to get back to the **Quick Initial Configuration** page, exit out of ExpressNAV and restart the process at Step 1 of the Use quick initial configuration procedure.*

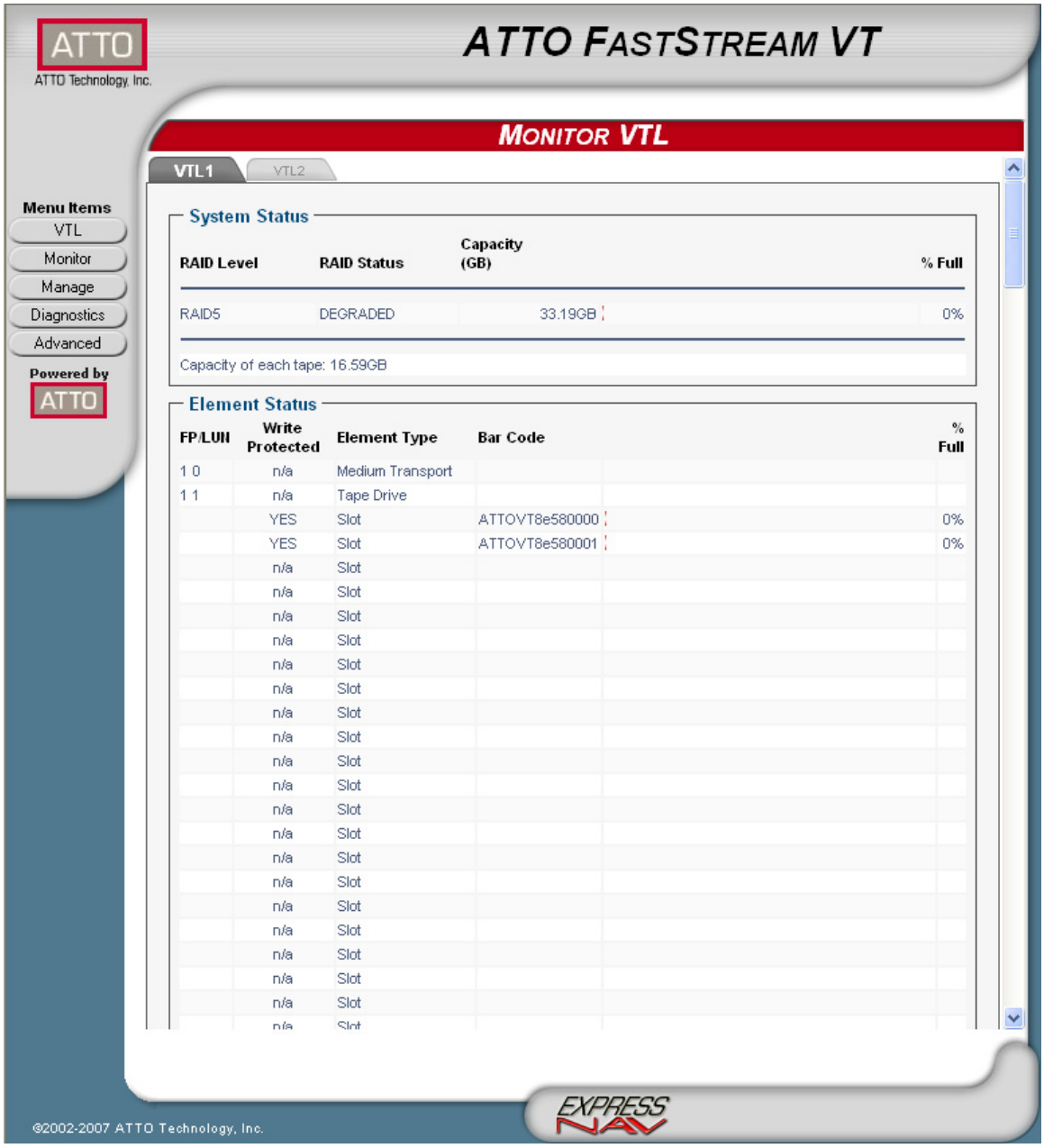
8 The **Virtual Tape Library Setup** page appears.

9 Click on **Done**. The **Monitor VTL** page appears. Exhibit 2.1-1 shows a **Monitor VTL** page.

Note

*To configure another VTL you must connect or power up drives which were not available before beginning the **Quick Configuration** procedure. Connect the drives, click on **Configure Another,** and the **VTL Custom Configuration** page appears. Continue with the procedure listed under Use custom setup on page 10.*

*Exhibit 2.1-1 The ATTO FastStream VT **Monitor VTL** page.*

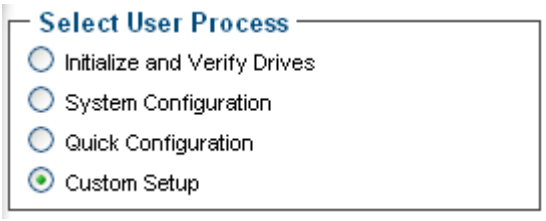


Use custom setup

Custom Setup allows you to configure the FastStream VT to best suit the needs, performance and level of reliability for your application. If you want to create more than one VTL, use custom setup. You may create up to two VTLs.

1 f you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 On the **Initial Setup** page, choose the **Custom Setup** button.



3 Click on **Next**.

4 Type a name for your Virtual Tape Library in the box provided on the page under the **Step 1** heading.

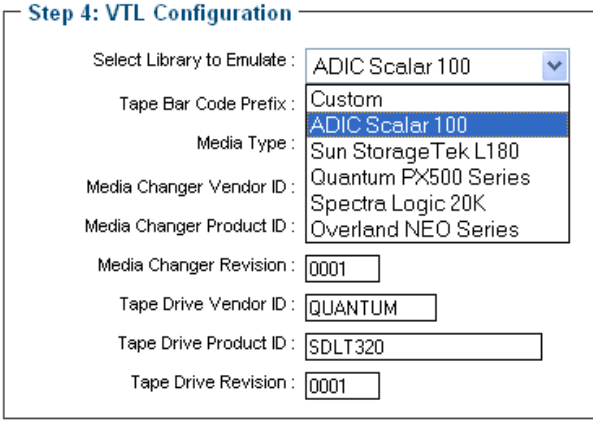
- In **Step 2**, select a RAID level. Refer to Designing RAID groups on page v in the Appendix for more information. Click on the Hot Spares radio button if you want a Hot Spare. Refer to Use Hot Spares on page 11.

5 In **Step 3**, click on the **System Scan** button to discover the drives available for VTL configuration.

6 When the scanned drives box is populated, select the drives to be used for the underlying RAID group associated with the VTL. The **Minimum Number Additional Drives Required** heading lists the number of drives you must add to fulfill the RAID level and Hot Spare requirements you have already selected.

7 Answer the questions in **Step 4** to define your virtual storage as if it were a physical tape storage array based on the needs of your ISV.

- You may select a library to emulate or select **Custom** to define your own setup.



  - If you select a library, default values for that library are entered into the fields in the rest of **Step 4** and in **Step 5**.
  - If you select **Custom**, you must complete the fields in **Step 4** and **Step 5** on the screen. However, some fields may be populated automatically for you depending on your system.

8 When you have completed your choices, click **Next**.

9 The **Virtual Tape Library Setup** page appears. If the new configuration is the way you want it, click on **Commit.**

10 In the warning box, verify that you want to add the VTL by clicking on **Yes**.

Note

*Clicking on **No** returns you to the **Virtual Tape Library Setup** page and you can choose to begin this procedure again*
*Click on the **Cancel** button.*
*Click on the **Manage** menu item on the left.*
*Select the **Virtual Tape Libraries** arrow.*
*Click on the **Create Virtual Tape Library** button.*
Continue with Step 3 in this process, typing in a name for your VTL.

11 The **Virtual Tape Library Setup** page appears.

- Click on **Done** if you do not want to create another VTL.
- Click on **Configure Another** to create another VTL. Begin the process from Step 4 in this process.

2.2 Use Hot Spares

If a member of a Virtual Tape Library becomes degraded or faulted, you lose some redundancy in your VTL until a new drive is rebuilt into the VTL. However, Hot Spare drives may be designated as replacements for faulted drives without intervention by you or a host.

The ATTO FastStream VT replaces degraded or faulted drives in a VTL without intervention by you or a host if you set up a pool of Hot Spare drives of different sizes appropriate for your VTL. Hot Spares may be set up by the FastStream VT automatically depending on your choices during initial setup.

Note

Drives in the Hot Spare pool should be of appropriate size to the RAID Group so that smaller drives are not replaced by much larger Hot Spare devices.

When the ATTO FastStream VT detects a faulted drive:

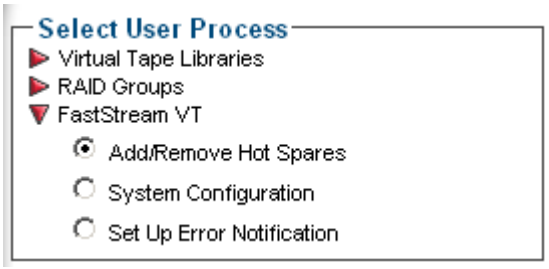
- The Controller searches the Hot Spare pool for the smallest drive of sufficient size to substitute for the faulted drive.
- The FastStream replaces the faulted drive with the drive from the Hot Spare pool.
- The FastStream begins an automatic rebuild of the RAID groups.

Note

A RAID rebuild may take up to two hours to complete.

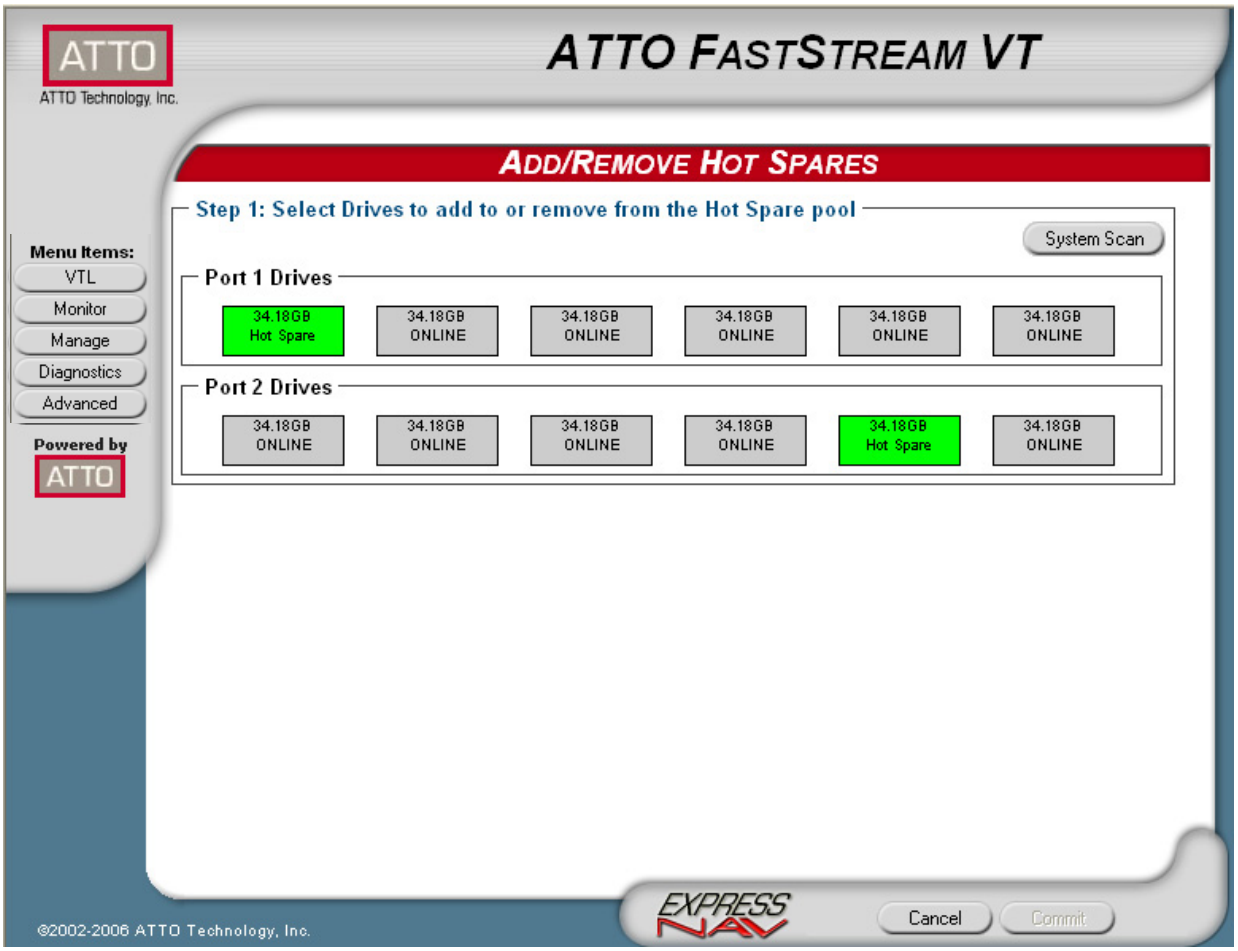
If you are adding Hot Spares using unallocated drives (ones which were not online during initial set up), ensure they are properly set up. Refer to Initialize and verify drives on page 7.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. The **Monitor VTL** page appears. On the left hand side menu, click on **Manage**.
3. On the splash page, click on the **FastStream VT** arrow.
4. Click on the **Add/Remove Hot Spares** button



5. Click on **Next**.
6. The **Add/Remove Hot Spares** page appears. Follow the on-screen directions. When you complete your changes, click on **Commit**.

Exhibit 2.2-1 Various screens throughout the ExpressNAV interface show you the status of drives, including Hot Spare designations.



2.3 Optional system modifications

Default values are appropriate for most configurations, but may be modified for your needs using the ExpressNAV interface.

Customize the user name, password

It is best practice to change the default user name and password.

1 Open a CLI session either using Telnet or the serial port as shown in Interface options on page 27.

2 Type **set Username [user name]**

3 Press **Enter.**

4 Type **set Password**

Note

The user name is case insensitive and password is case sensitive.

5 Press **Enter.**

6 Follow the instructions on the screen to confirm your old and new password.

The user name and password for all Telnet, FTP and ATTO FastStream VT browser-based user interface sessions is changed.

Customize system configurations

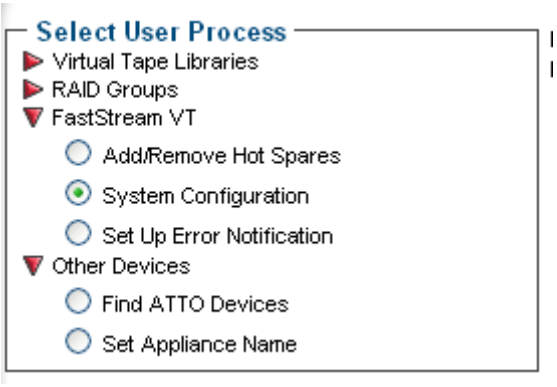
You may change several parameters using the **System Configuration** page of the ExpressNAV interface.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 The **Monitor VTL** page appears. In the left-hand menu, click on the **Manage** button.

3 In the main splash screen, click on the **FastStream VT** menu item.

4 Click on the **System Configuration** button



5 Click on **Next**.

6 Click on the choices available. A choice may be greyed out because it is not available based on a previous choice.

- **Appliance name**: you may wish to give this FastStream VT a name which is significant to you if you are managing several ATTO devices from a single workstation.
- **Time** and **Date**. (Refer to Time and TimeZone on page xxi and Date on page xii of the Appendix)
- Fibre Channel **data rate** and **connection mode** for each Fibre Channel port. (Refer to FCDataRate on page xv and FCConnMode on page xiv of the Appendix).
- Enable or disable **hard address** assignment (refer to FCHard on page xv of the Appendix)
- Change the SCSI ports' bus speed or initiator ID (refer to SCSIPortBusSpeed and SCSIInitID on page xix of the Appendix.

7 When you have completed your changes, click on **Commit**.

Customize other parameters using the Advanced CLI page

Changes to other parameters may be made using the **Advanced** page.

CAUTION

Do not use this page unless you are directed to by an ATTO technician.

Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

Note

The ExpressNAV interface is the preferred method to manage the FastStream.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 The **Monitor VTL** page appears. In the left-hand menu, click on the **Advanced** menu item on the left side of the screen.

3 The **Advanced CLI Configuration** page appears. Wait for the **Ready** prompt, then type in the CLI command in the text box provided. Refer to CLI provides an ASCII-based interface on page vii of the Appendix.

4 Click the **Submit** button: this is equivalent to typing in the CLI command into a telnet or serial port CLI session.

A text field beneath the box lists the most recent commands issued to the FastStream through this page. If you enter an incorrect parameter, the CLI help text is displayed, showing the parameters available. An asterisk next to the **Ready** prompt indicates you must type **SaveConfiguration restart** in the text box for changes to take effect.

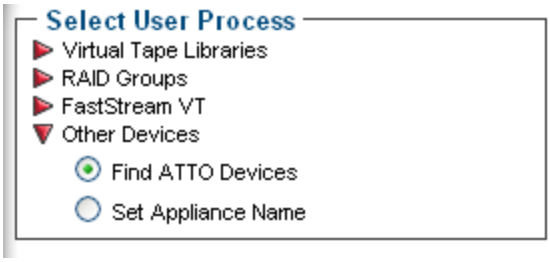
Discover, manage other ATTO devices

If you have other ATTO devices in the same broadcast domain with no routers between them, and any switches between this FastStream VT and the other devices are configured to forward UDP broadcast messages, you may physically identify these devices and manage them from within the browser you are currently using.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 The **Monitor VTL** page appears. In the left-hand menu, click on the **Manage VTL** menu item on the left side of the screen.

3 Click on the **Other Devices** arrow.



4 Click **Next.**

5 Click on the **Rescan** button

6 Select a device from the list.

- Press the **Identify** button to activate a blinking LED on the selected product. Click on the listed device again to stop the blinking LED.
- Click on the device from the list and click on the **Launch in Browser** button to view the device's management console.

Create a name for your FastStream

You may wish to name your FastStream VT if you are going to manage several ATTO devices from one browser.

1 Click on **Set Appliance Name.**

2 Click on **Next**

3 Enter the name in the text box provided on the **System Configuration** page

4 Click **Commit**

3.0 Monitor storage, configurations

You may monitor storage and determine the performance of drives attached to the FastStream VT using various displays and tests in the ExpressNAV interface.

If you have set up at least one Virtual Tape Library (refer to Configure Virtual Tape on page 7.), you may monitor various aspects of your storage and the VT and to view various metrics to measure performance for physical drives attached to the FastStream during normal system operation and drive initialization and verification.

CAUTION

New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the ExpressNAV interface completely whenever you need maximum performance.

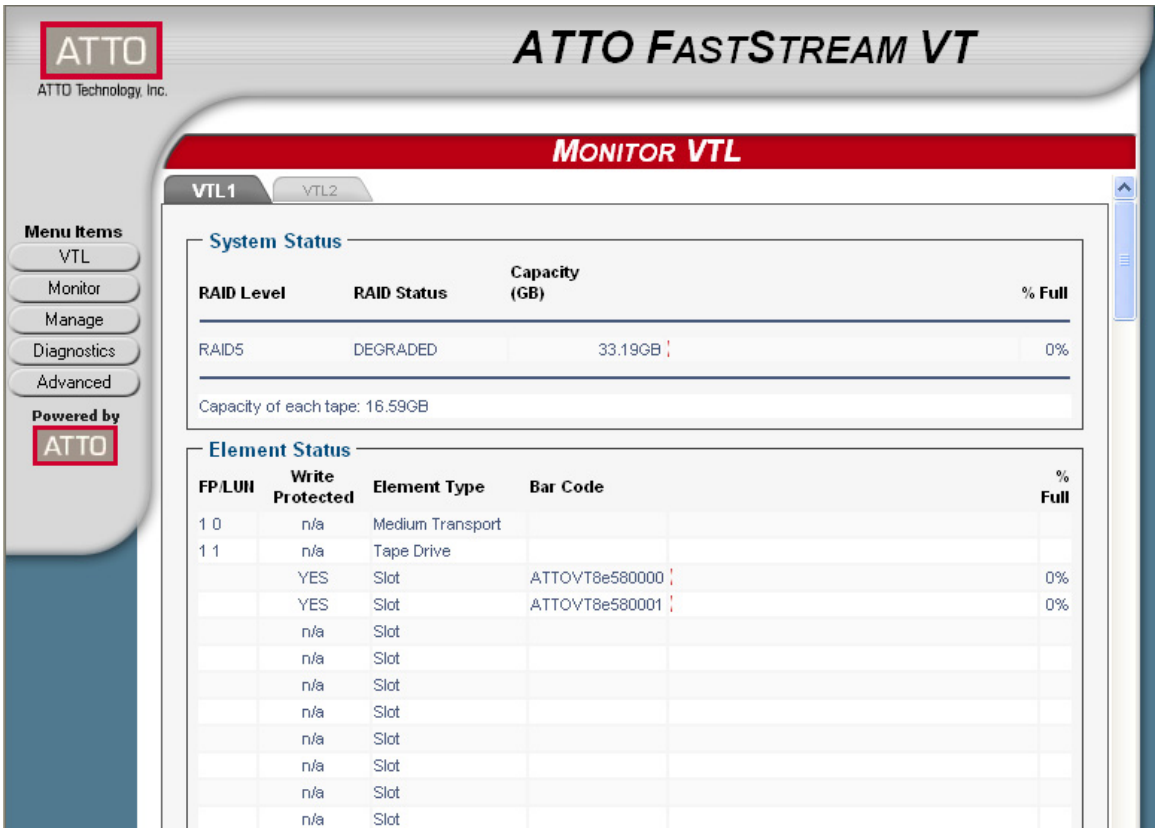
Monitor VTL page

The **Monitor VTL** page is the first page you see when you open the ExpressNAV interface after setting up at least one VTL.If you have not created a VTL, the body of the page is blank.

Each VTL has its own tab. Information displayed includes RAID Level, RAID status, capacity, the Fibre Port and LUN to which the VTL is mapped, the element, element type, its bar code and whether or not the element is write protected.

To get further information or to manage the VTL, click on the menu items on the left-hand side of the screen. To return to this screen at any time, click on **VTL**

*Exhibit 3.0-1 The ATTO FastStream VT **Monitor VTL** page.*



Health and Status Monitor page

the Health and Status Monitor provides information about the RAID group status, FastStream VT environmental status, Ethernet and Fibre Channel interface states, and drive status, including links to diagnostics and more detailed information.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 The **Monitor VTL** page appears. On the menu at the left hand side of the page, click on **Monitor**.

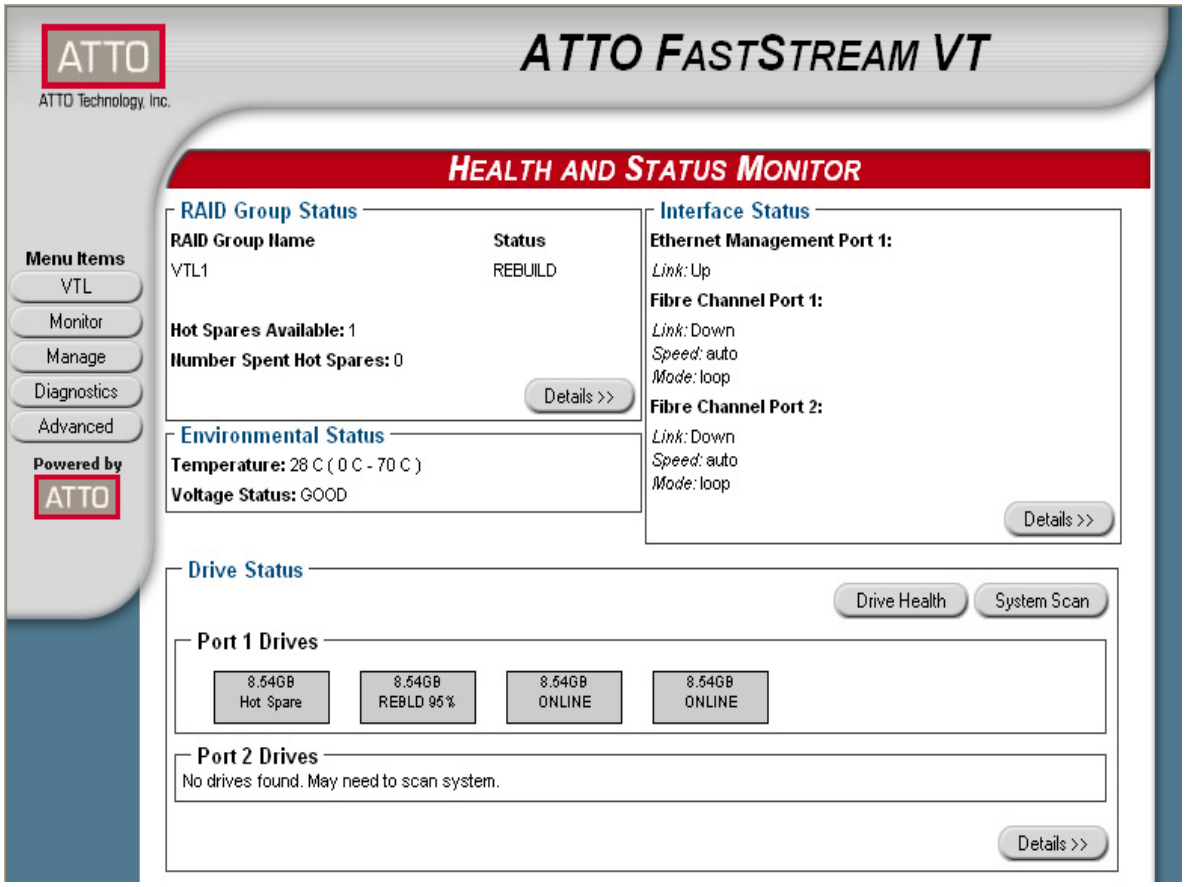
3 The **Health and Status Monitor** page appears. If you click **Details,** added information about each parameter appears on the **Configuration Display** page (refer to Configuration Display page below).

- RAID Groups: RAID Group names, RAID status, available Hot Spares and the number of Hot Spares which have been substituted for faulted drives.
- Environmental Status: Temperature and voltage of the FastStream VT
- Interface Status: Ethernet management port link status and Fibre Channel port link, speed and connection mode
- Drive status by port: Size and status

If you click on **Drive Health**, the **Drive Performance and Health** page appears (refer to Measure drive performance and health on page 20) which may also be reached by clicking on the left hand menu item **Diagnostics**.

If you click on **System Scan**, the FastStream VT scans for attached drives and populates the **Port 1 Drives** and **Port 2 Drives** sections of the page.

*Exhibit 3.0-1 The **Health and Status Monitor** page.*

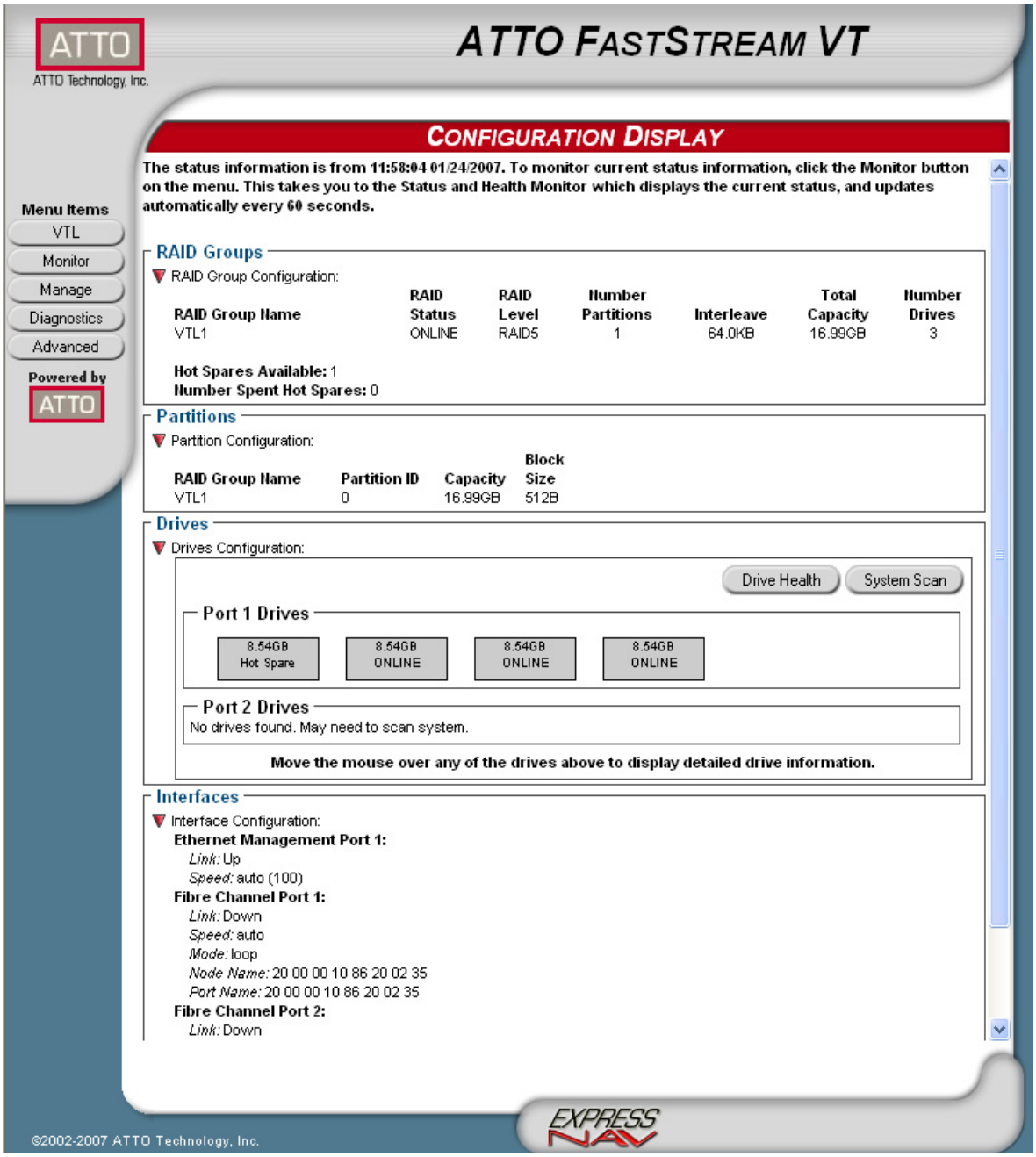


Configuration Display page

Clicking on **Details** in the **Health and Status Monitor** page gives you added information about each parameter on the **Configuration Display** page. You may view the details of any parameter from this page.

- RAID Groups: RAID Group names, RAID status, available Hot Spares, number of faulted drives, RAID Level, Interleave and total capacity of each RAID Group.
- Drives: Drive Configuration by port, including drive size and status
- Interfaces: Ethernet management port link status and Fibre Channel port link, speed, connection mode, Node Name and Port Name.

*Exhibit 3.0-2 The **Configuration Display** page.*


ATTO
ATTO Technology, Inc.
ATTO FastStream VT
Configuration Display
The status information is from 11:58:04 01/24/2007. To monitor current status information, click the Monitor button on the menu. This takes you to the Status and Health Monitor which displays the current status, and updates automatically every 60 seconds.
Menu Items
VTL
Monitor
Manage
Diagnostics
Advanced
Powered by
ATTO
RAID Groups
RAID Group Configuration:
RAID Group Name | RAID Status | RAID Level | Number Partitions | Interleave | Total Capacity | Number Drives
VTL1 | ONLINE | RAID5 | 1 | 64.0KB | 16.99GB | 3
Hot Spares Available: 1
Number Spent Hot Spares: 0
Partitions
Partition Configuration:
RAID Group Name | Partition ID | Capacity | Block Size
VTL1 | 0 | 16.99GB | 512B
Drives
Drives Configuration:
Drive Health
System Scan
Port 1 Drives
8.54GB Hot Spare
8.54GB ONLINE
8.54GB ONLINE
8.54GB ONLINE
Port 2 Drives
No drives found. May need to scan system.
Move the mouse over any of the drives above to display detailed drive information.
Interfaces
Interface Configuration:
Ethernet Management Port 1:
Link: Up
Speed: auto (100)
Fibre Channel Port 1:
Link: Down
Speed: auto
Mode: loop
Node Name: 20 00 00 10 86 20 02 35
Port Name: 20 00 00 10 86 20 02 35
Fibre Channel Port 2:
Link: Down
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EXPRESS NAV

Phone home: E-mail messages

E-mail notification allows the FastStream VT to send an E-mail message to you, a network administrator or other users when certain events occur. Serious error messages are sent immediately, while less serious error messages are sent every 15 minutes.

Conditions which may launch E-mails include

- SCSI device errors
- Device transitions from online to offline
- Temperature conditions
- Voltage conditions
- Power recycle/power failure
- VTL nearing space capacity

Warning levels include

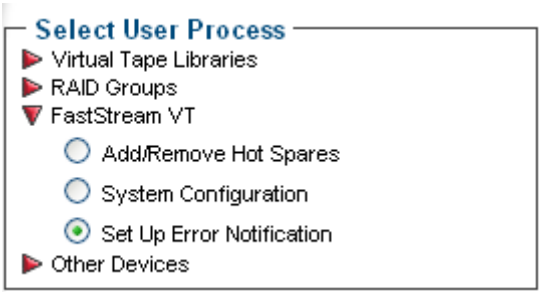
- **All**: warnings, critical events and informational messages are sent
- **Critical:** critical event E-mails are sent
- **Warning:** warnings and critical event E-mails are sent
- **Informational:** information only is sent
- **None**: no E-mails are sent

You may send E-mails to up to five E-mail addresses and designate which conditions prompt each E-mail notification.

When an event occurs that warrants E-mail notification, the FastStream VT sends the message; it cannot respond to a rejection by a server for an invalid address.

Each E-mail is time stamped when it leaves as part of the SMTP header information as shown in Exhibit 3.0-3.

1. If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2. The **Monitor VTL** page appears. On the menu at the left hand side of the page, choose **Manage**.
3. The **Manage VTL** page appears. Click on the **FastStream VT** arrow.
4. Click the **Set up Error Notification** button



5. Click **Next.**
6. Click on the **Notification Configuration Enabled** button.
7. Type in the sender address (E-mails show this name in the **From** field)
8. Type in the SMTP Server IP Address
9. Type in the user name and password of your SMTP E-mail account
10. Type in up to five E-mail addresses
11. Choose **All**, **Critical**, **Warning** or **Informational** for each E-mail address.
12. When all information is typed in, click **Commit**.
13. Your settings are displayed. You may change or disable E-mail notification at any time.

Exhibit 3.0-3 The E-mail messages sent by the FastStream VT follow this format.

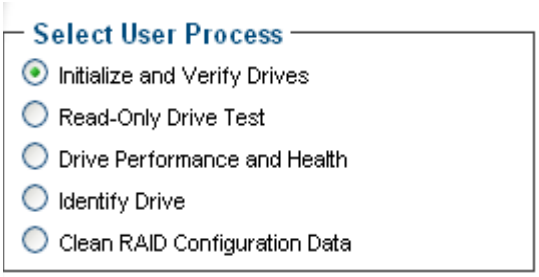
```
Subject: [The Type of Event that Occurred]
Message Body:
This is a status message from [FastStream name]. Identifying information as well
as the most recent entries from the event log appear below.
*************** Unit Information  ***************
Serial Number : [Serial Number]
IP Addresses:  [IP Address1]
               [IP Address2]
***************  Event Log Entries  ****************
[Listing of the ten latest event log entries]
```

Identify drive issues

The FastStream VT collects various metrics to measure performance for physical drives attached to the FastStream during normal system operation and drive initialization and verification.

Preliminary steps

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.
2 The **Monitor VTL** page appears. On the menu at the left hand side of the page, click on **Diagnostics**.
3 The **Diagnostics Menu** page appears. Click on the button for the process you wish to use.



Initialize and verify drives

You may verify the status of storage which does not belong to a VTL (unattached storage). If the verify operation detects an error, the FastStream tries to re-initialize the drive, erasing information stored on the drive. Be sure to back up data before performing verification.

CAUTION

Data is erased during this process. Back up your data before selecting Commit.

These operations have a negative impact on the performance of normal operations; all activity should be stopped.

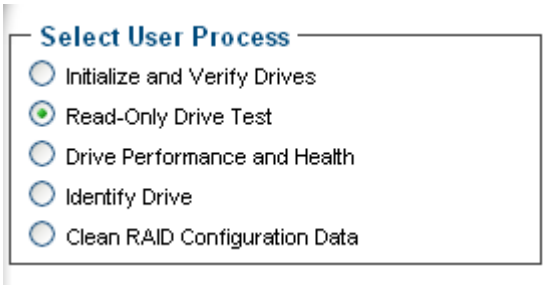
1 Follow the instructions in Preliminary steps on page 19.
2 Click the **Initialize and Verify** button
3 Click **Next**
4 Click on the drives you wish to test; the drives are highlighted.
5 Select **Verify Only**
6 Click **Commit**
7 A warning message displays; choose **yes** to continue.
8 The **Drive Performance and Health** screen appears. The **Time Remaining** box tells you how much time remains until the verification process is complete. The representation of each drive in the **Drives** box shows the percentage of verification completed.

Scan drive surfaces: read-only drive test

The read only test performs a non-destructive scan over the entire surface of each drive to identify bad areas of the disk drives and determine read performance. It may be run while data is passing through the FastStream.

Running this test may negatively impact performance. Once the test has completed, system operation returns to normal.

1 Follow the instructions in Preliminary steps on page 19.
2 Click the **Read-Only Drive Test** button



3 Click **Next**
4 Choose the drives you wish to test
5 Click **Commit**
6 A warning message displays; choose **yes** to continue.
7 The **Drive Performance and Health** screen appears with the **Drive Metrics** box displaying basic information about the drives. Click on the **Show Help Text and Drives** arrow.
8 If a drive is being read, its display shows the percentage of progress. When the test is complete, click on each drive to see its information highlighted in the **Drive Metrics** window.

Note

*If you close the browser or navigate away from this page, you may re-access these results by clicking the **Diagnostics** button and choosing the **Drive Performance and Health** option. Results are available until the FastStream is restarted.*

Measure drive performance and health

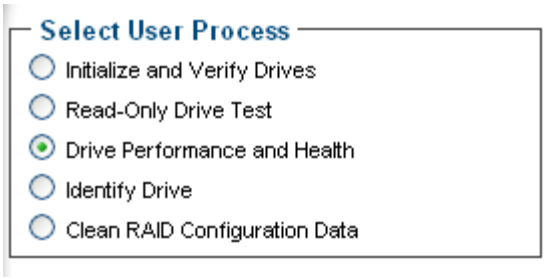
New performance data is updated every 60 seconds which impacts performance slightly, even if you minimize the browser window. Exit the ExpressNAV interface completely whenever you need maximum performance.

During the testing process, the **Drive Performance and Health** screen appears. Click on **Show Help Text and Drives** for an alternative view of the test progress.

During the tests the **Time Remaining** box tells you how much time remains until the verification process is complete. The representation of each drive in the **Drives** box shows the percentage of verification completed.

When the test is complete, click on each drive to see its information highlighted in the **Drive Metrics** window.

1 Follow the instructions in Preliminary steps on page 19.
2 Click on **Drive Performance and Health**.



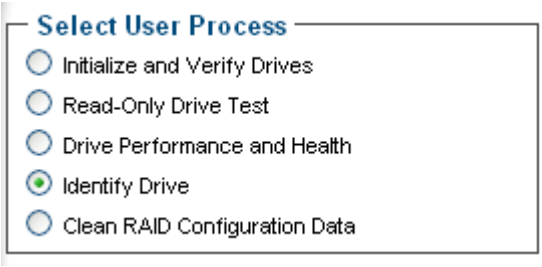
3 Click **Next.**
4 The **Drive Performance and Health** page appears. Click on a drive in the drive section.
5 Click **Start**.
6 Drive performance is displayed under the **Drive Metrics** section of the **Drive Performance and Health** page. Drive errors are displayed in the **Drive Errors** section of the page.

Identify a drive attached to the FastStream

CAUTION

Executing this command adversely impacts performance and throughput for the time that the LED is illuminated.

1 Follow the instructions in Preliminary steps on page 19.
2 Click on **Identify Drive**.



3 The **Identify Drive** page appears. Click on any drive. Only one drive may be selected at a time.
4 Click **Commit**. The I/O LED of the drive illuminates for one minute.
5 To stop the operation, unselect the drive.

Note

To clean RAID configuration data, refer to Clean RAID configuration information on page 25.

4.0 Modify storage

Use the ExpressNAV interface to replace a failed drive, add new drives or redesign VTL configurations.

The ExpressNAV interface takes you step by step through many procedures which allow you to modify your storage and VTL. Read all notes and cautions carefully as you go to ensure the best performance and use of your storage.

Be cautious when deleting storage or rearranging storage configurations because data could be compromised or lost. Many of these procedures are only available when using unallocated drives or storage.

When you initially set up the FastStream, replace a failed drive or add new drives to the FastStream, perform drive initialization and verification to ensure the integrity of these drives (refer to Initialize and verify drives on page 7).

CAUTION

Clicking on Commit during RAID configuration causes all previous storage data on the drive to be erased. Ensure all data is backed up.

Preliminary steps

Note

An unallocated drive or unallocated storage is storage which is not part of a RAID group, not designated as a Hot Spare or was offline when you initially set up a RAID configuration using the ExpressNAV interface.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

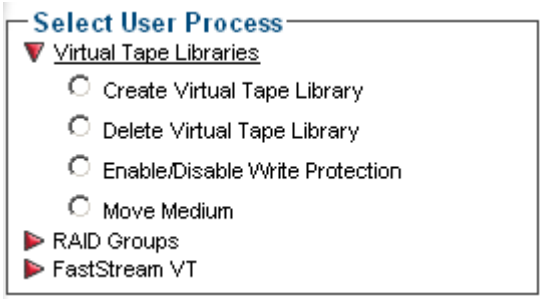
2 The **Monitor VTL** page appears.

3 Click on the appropriate button on the left hand side of the ExpressNAV interface.

4 Select the operation you wish to perform from the next menu presented.

Virtual Tape Library operations

You may add to, delete or change the VTLs in your configuration using the ExpressNAV interface.



Create a Virtual Tape Library

1 Follow Preliminary steps above and click on the **Manage** button.

2 The **Manage VTL** page appears. Choose the **Virtual Tape Libraries** arrow.

3 Click on **Create a Virtual Tape Library**.

4 Follow the instructions in Use custom setup on page 10.

Delete a Virtual Tape Library

1 Follow Preliminary steps above and click on the **Manage** button.

2 The **Manage VTL** page appears. Choose the **Virtual Tape Libraries** arrow.

3 Click in the **Delete Virtual Tape Library** button.

4 Click on **Next**.

5 Click on radio box displaying the name of library.

6 Click **Commit**

7 In the warning box, verify that you want to delete the VTL by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 After the process completes, the **VTL Monitor** page appears

Secure data through Write Protection

For added security, write protection can be enabled for any tape cartridge with a VTL. When write protection is enabled, existing data on the tape cartridge cannot be overwritten or erased.

The displayed data can be sorted by any field by clicking on the heading for the field; clicking twice reverses the sort order.

1 Follow Preliminary steps on page 21 and click on the **Manage** button.
2 The **Manage VTL** page appears. Choose the **Virtual Tape Libraries** arrow.
3 Click in the **Enable/Disable Write Protection** button.
4 Click on **Next**.
5 Click on the tab with the name of the VTL for which you wish to change write protection.
6 Click in the radio box next to the element you wish to change.
7 Click **Commit**.
8 A warning box appears. If you wish to proceed, click on **Yes**. Clicking on **No** ends the procedure without making a change.
9 The **Enable/Disable Write Protection** page appears.

If you wish to protect other elements or elements in another library, select the library and repeat this procedure.

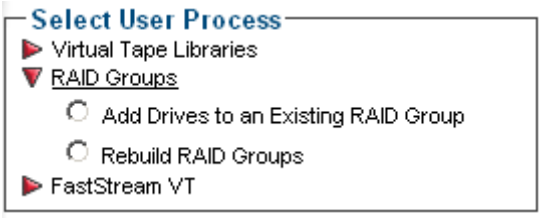
Move Virtual Tape cartridges

The **Move Medium** page is an interface which simulates a generic library front panel operation.

1 Follow Preliminary steps on page 21 and click on the **Manage** button.
2 The **Manage VTL** page appears. Choose the **Virtual Tape Libraries** arrow.
3 Click in the **Move Medium** button.
4 Click on **Next**.
5 The **Move Medium** page appears. Click on the tab with the name of the Virtual Tape Cartridge for which you wish to move medium.
6 Click on the radio button next to the Virtual Tape Cartridge element you wish to move.
7 Click on the radio button next to the new place where you want the Virtual Tape Cartridge element.
8 Click **Commit**.
9 The **Move Medium** page appears.
10 If you wish to move other VTL cartridge elements, repeat this procedure.

RAID group procedures

You may change the RAID groups underlying your VTLs using the ExpressNAV interface.



Increase the size of a VTL

If you have unallocated drives, you can increase the number of drives used by an existing VTL by adding an unallocated drive to the VTL RAID group. The increased capacity of the RAID group becomes additional Virtual Tape cartridges in the library. You may have to add more than one drive.

1 Follow Preliminary steps on page 21 and click on the **Manage** button.
2 The **Manage VTL** page appears. Select the **RAID Groups** drop down arrow.
3 Click on **Add Drives to a RAID Group**
4 Click on **Next**
5 Select the RAID group associated with the VTL you wish to add the drives to from the drop down menu.
6 Click on the drives you wish to add to the RAID group.

CAUTION

Adding drives to an existing RAID group may adversely impact performance. You cannot reverse this operation unless you delete the RAID group.

7 When you have completed your changes, click on **Commit**

CAUTION

During this procedure, *do not* power down the host or the ATTO FastStream VT until the Health and Status Monitor page displays. Any interruption of power while storage is being reorganized results in the loss of data.

8 In the warning box, verify that you want to add the drives to the RAID group by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

9 The **Health and Status Monitor** page appears.

Rebuild RAID groups

If you receive an E-mail notification from the FastStream VT as set up previously using the Phone Home error notification (refer to Phone home: E-mail messages on page 18) or otherwise realize a drive has failed, and you do not have available drives in the Hot Spares pool (refer to Use Hot Spares on page 11), follow this procedure to replace the failed drive and manually begin a rebuild operation. If you have available drives in the Hot Spare pool, any failed drive is replaced by a Hot Spare automatically.

1 Follow Preliminary steps on page 21 and click on the **Diagnostics** button.

2 The **Diagnostics** page appears. Click on **Identify Drive.**

3 Click **Next**

4 Click on the degraded drive.

5 Click **Commit**

6 The LED on the degraded drive flashes.

Note

*The status of a drive which cannot be accessed is displayed as **Unavailable**. To identify this drive, observe the access lights for all drives in the RAID group during disk access: if the LED is not flashing on a drive, it is the unavailable drive.*

7 When you have identified the failed drive, select the drive in the **Identify Drive** box to stop the LED flash.

Note

It is best practice to stop drive activity while changing drives.

8 Remove the failed drive from the array.

9 Insert the new drive into the array.

10 In the ExpressNAV interface, click the **Manage** button.

11 Click the arrow next to **RAID Groups**.

12 Select **Rebuild RAID Groups**.

13 Click **Next**.

14 At the **Step 1: Select a RAID group**, select **Degraded Drives** from the drop down menu.

15 Degraded drives are listed under **Step 2: select a RAID group member**. Click on the degraded drive to rebuild. The graphic changes color.

16 Under **Step 3: select a replacement drive**, select the new drive. The graphic changes color.

17 Click **Commit**

18 In the warning box, verify that you want to rebuild the RAID group by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

19 When the procedure is complete, the **RAID Group Rebuild** page appears.

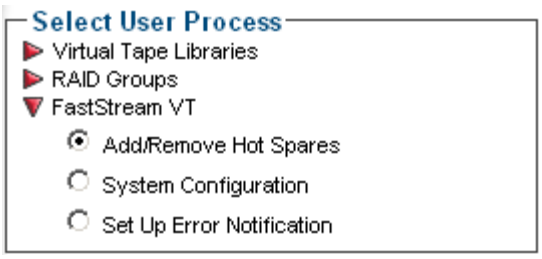
FastStream operations: add or remove Hot Spares

For an explanation of Hot Spares, refer to Use Hot Spares on page 11.

1 Follow Preliminary steps on page 21 and click on the **Manage** button.

2 The **Manage VTL** page appears. Click on the **FastStream** drop down arrow.

3 Select the **Add/Remove Hot Spares** button.



4 Click **Next**

5 Select the drive(s) you want to add or remove from the Hot Spare pool.

6 When you have completed your changes, click **Commit**.

7 In the warning box, verify that you want to add or remove the Hot Spare by clicking on **Yes**. Clicking on **No** ends the procedure without making a change.

8 When the process is complete the **Health and Status Monitor** page appears.

9 For **System Configuration** and **Other Devices,** refer to Customize system configurations on page 13. For **Set Up Error Notification**, refer to Phone home: E-mail messages on page 18

Add a VTL from another FastStream VT

You may attach a VTL from another FastStream VT to the FastStream VT you are currently working with. The current FastStream VT must discover the other VTL through mapping. When you create your first library, the media changer and tape drive LUNs are mapped automatically to one of two ports. When you recognize a second library, it may be mapped to the other port or to the same port.

Note

The FastStream VT supports two libraries, one on each port or both on one port.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 Click on the **Advanced** button.

3 In the text box provided type **blockdevscan**.

4 Click on **Submit**.

5 The FastStream discovers the VTL from the other FastStream. In the text box provided type **AutoMap**.

6 Click on **Submit**.

7 When **Ready*** is displayed in the screen below, type **SaveConfiguration**.

8 Click on **Submit**.

9 Click on the **VTL** menu item on the left hand side of the screen.

10 The **Monitor VTL** page appears. A tab for the library you just added is displayed.

5.0 Update storage and firmware

*You can update the ATTO FastStream VT at any time. Refer to **www.attotech.com** for complete information.*

Several methods are available to update the ATTO FastStream firmware and to re-initialize unattached storage. Be sure all data is backed up before using any of these procedures to prevent data loss.

Clean RAID configuration information

This feature only works with drives that belong to RAID groups and drives that had once been part of a RAID Group and are now flagged **Replaced**.

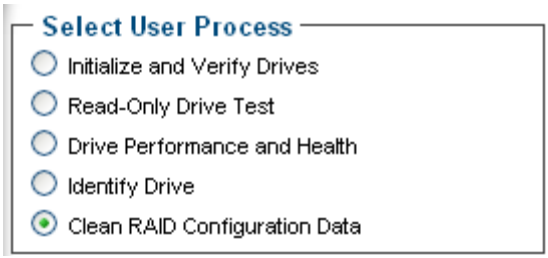
CAUTION

Data is erased during this process. Back up your data before selecting Commit. These operations have a negative impact on the performance of normal operations; all activity should be stopped.

1 If you are not already in the ExpressNAV interface, type the IP address of your appliance, as found in Use the ExpressNAV interface on page 27, in a standard browser, click **Enter Here** and type in your user name and password.

2 Click the **Diagnostics** button

3 Click the **Clean RAID Configuration Data** button



4 Click **Next**

5 Click on the drive you wish to process; the drive is highlighted.

6 Click **Commit**.

7 A warning message displays; choose **yes** to continue.

8 The **Health and Status Monitor** screen appears

Note

*To clean Hot Spare information from a drive, use the **Add/Delete Hot Spares** feature to delete the Hot Spare. Refer to Use Hot Spares on page 11.*

Update firmware

The ATTO FastStream VT has several processors which control the flow of data. The firmware to control these processors can be upgraded in the field using the PUT command from an FTP connection or the zModem utility over an RS-232 serial connection.

CAUTION

Ensure that all I/O to the ATTO FastStream VT has stopped.

During this procedure, *do not* interrupt the flash process. Do not power down the host or the ATTO FastStream VT until the display returns the Ready prompt. Interrupting the flash process makes your ATTO FastStream VT inoperable and you must return it to ATTO for repair.

Preliminary steps

1 The ATTO FastStream VT firmware is distributed as a compressed .zip file. Uncompress the **.zip** file into an image file (**.ima**). Note the filename. The **.zip** file can be uncompressed using any utility that supports the **zip** format.

2 Decide whether to use FTP over Ethernet or a terminal program using the RS-232 serial link,

and continue with one of the following procedures.

Use FTP over Ethernet

1 Establish an FTP link to the ATTO FastStream VT that is to be flashed.

2 Use the **PUT** command to download the firmware. For example

```
PUT c:\firmware\FS5300100.IMA
```

3 Once the download is complete, cycle power on the ATTO FastStream VT to implement the new firmware.

Use the RS-232 serial link

1 Load a Terminal Program such as Hyper Terminal.

2 Set the terminal and the ATTO FastStream VT for the highest possible baud rate for your terminal.

3 Turn on power to the ATTO FastStream VT.

4 Once the Ready prompt appears, type **ZMODEM RECEIVE.** The ATTO FastStream VT displays that it is preparing to receive a file from your terminal program.

5 On the terminal program, choose **Transfer Send File**

6 In the **Send File** box, type in the current ATTO FastStream VT **.ima** file or click the browse button to find it

7 Click **Send File**

8 The ATTO FastStream VT should acknowledge receiving the file and display a message not to interrupt power for 90 seconds.

9 Once the download is complete, cycle power on the ATTO FastStream VT to invoke the new firmware.

6.0 Interface options

The best way to manage, monitor and configure the FastStream VT is to use the ExpressNAV interface, but you may use a terminal emulation program or Telnet.

The ExpressNAV interface is the preferred method to operate and manage the FastStream VT. However, it may be necessary to use other methods to access the FastStream VT, such as to change the user name and password (refer to Customize the user name, password on page 13).

CAUTION

Changing parameters other than those offered in the ExpressNAV interface may cause loss of data and/or disruption to performance and reliability of the FastStream.

Use the ExpressNAV interface

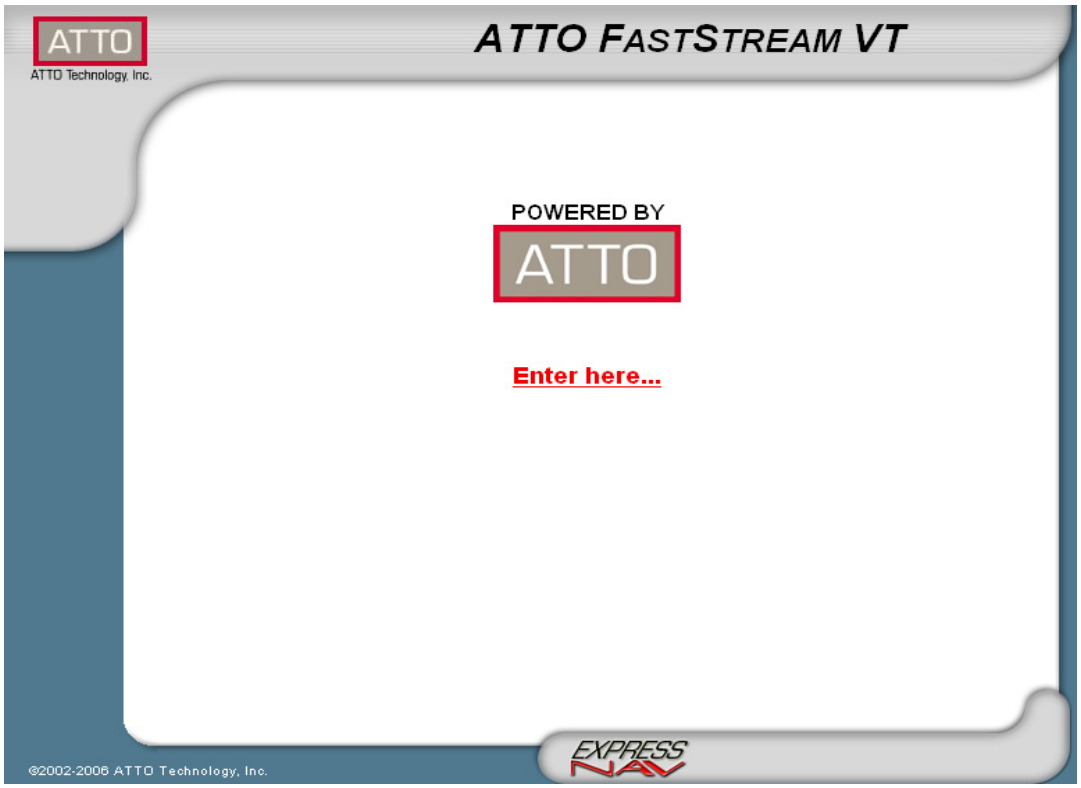
Use the ExpressNAV interface to manage, monitor and configure the unit. The choices you make lead you from screen to screen. Choices which are not available are greyed out.

1 Working from the computer attached to the FastStream VT Ethernet port, open your browser and type in the FastStream VT IP address as noted in Discover the IP address on page 5.
2 Your browser points to the FastStream VT splash screen. Click on **Enter here...**
3 Type in the user name and password values.

Note

*The default values are user name: **root** and password: **Password**. The user name is case insensitive and the password is case sensitive*

The pages which next appear depend on whether or not you have begun configuring the FastStream VT. Refer to Configure Virtual Tape on page 7.



Use the serial port

To connect to a terminal emulation program or Telnet to manage the FastStream VT, use the serial port.

1 Connect a cable from FastStream VT RS-232 serial port or header to the serial (COM) port on a personal computer.
2 Turn on the FastStream VT.
3 Start a terminal emulation program on the personal computer, and use it to connect to the FastStream VT. For example, if you are using HyperTerminal on a computer running a Windows operating system,
   a. Type **FastStream VT 5300** in the **New Connection** dialog box.
   b. Click **OK**.
   c. Select the COM port number to which your serial cable is connected in the **Connect To** dialog box, then click **OK** in the **Connect using** field
   d. In the **COM Properties** dialog box select the following values:
      - Bits per second: 115200
      - Data Bits: 8
      - Parity: None
      - Stop Bits: 1
      - Flow Control: None
      - Terminal type: ASCII
      - Echo: on
   e. Click **OK**
4 After you connect to the FastStream VT, start-up messages are displayed. The last line in the start-up message sequence is **Ready**.

Make adjustments to the FastStream VT using the Command Line Interface as described in CLI provides an ASCII-based interface on page vii of the Appendix..

Note

*In serial port sessions, there is no prompt on the line below the word **Ready**. Begin typing commands in the blank line where the cursor is resting. No user name or password is required for serial port access.*

5 To verify that you have connected successfully, type **help** after the **Ready** prompt and press **Enter.**

If a list of all available commands does not appear on the screen, review the steps in this section, check the cable, or contact service personnel until the problem is solved.

If you have difficulty using the serial port, verify that you have the correct settings and that your serial cable is less then two meters long.

Use Telnet

Up to three Telnet sessions can be conducted simultaneously. A serial port session can use the CLI while Telnet sessions are open. Whichever session issues the first “set” CLI command can continue to issue set commands, while the other sessions can only issue “get” commands or display information.

Once a connection is established, refer to CLI provides an ASCII-based interface on page vii of the Appendix..

1 Connect to the FastStream VT from a computer on the same Ethernet network.
2 Start a Telnet session.

Note

There is more than one way to connect to the FastStream VT using a telnet program.Your telnet program may operate differently than in the following instructions.

3 At the telnet prompt, issue the **open** command where x.x.x.x is the IP address of the FastStream VT.

```
telnet > open x.x.x.x
```

4 If you have to specify a port type, type in the port type “telnet” and the terminal type “vt100”.

```
port type: telnet
terminal type: vt100
```

5 Type in the default values for the user name, **root**, and the password, **Password**, if you did not set new values in Discover the IP address on page 5.

Appendix A Glossary

Familiarity with the following terms may be useful. Other sources for terms used in storage applications may be found at

Term	Definition
Bridge LUN	Virtual Tape Appliance LUN for processor functionality
CLI	Command Line Interface, A set of ASCII-based commands which perform configuration and diagnostic tasks. Refer to Interface options on page 27 and CLI provides an ASCII-based interface on page vii of the Appendix.
Heterogeneous block devices	Block devices which may be comprised of different protocols, vendors, products and capacities, but **must** have the same block size
Hot Spare	A block device reserved to replace a failed member of a RAID group by assuming the role and contents of the failed member. Refer to Use Hot Spares on page 11
Logical Unit	A target device that implements a device model and manages tasks to process commands sent by an application client
LUN	Logical Unit Number. A 64-bit identifier for a logical unit
LUN Mapping	The ability to map a virtual media changer and tape drives to specific LUNs
Partition	A subset of addressable storage space within a RAID group
Partial Data Transfer	The act of breaking a single large data transfer into several smaller individual data transfers across a storage protocol
RAID Group	Physical block devices of an arbitrarily-sized set which are acted upon as a group using a single RAID algorithm
RAID Member	A block device assigned to a RAID group
Span Depth	The number of block devices concatenated to behave logically as a single RAID member
Storage Network	A bus, Storage Area Network (SAN) or other topology on which storage devices are attached
Tape Group	A set of RAID groups, associated with virtual tape drives and a virtual media changer, whose storage is divided into virtual tape volumes
Virtual Tape Volume	A logical simulation of a tape volume using a subset of addressable storage space within a RAID group assigned to a tape group
Virtual Tape Drive	A logical simulation of a Sequential Access tape device associated with a tape group and that reads data from and writes data to virtual tape volumes within the tape group
Virtual Media Changer	A logical simulation of a media changer associated with a tape group permits the assignment of specific virtual tape volumes of the tape group to specific virtual tape drives within the tape group

Appendix B Cabling

Additional information to physically connect ports to devices and to your SAN.

SCSI cabling

Cables and devices must be chosen to maximize performance and minimize the electrical noise from the high-speed data transfers available with the SCSI protocol. Cabling and termination methods become important considerations for proper performance. SCSI cables and devices are subject to specific length and number limitations to deal with electrical problems that arise at increased operating speeds.

Cable types

Use high-quality cables rated for the type of SCSI transfers required: well-insulated SCSI cables ensure error free communications. Try to keep cable lengths as short as possible to ensure higher signal quality and performance.

Note

UltraSCSI is very sensitive to SCSI bus noise, cable distances and the number of devices connected on the SCSI bus. Carefully connect your devices when working with UltraSCSI.

Exhibit A-1 Various types of SCSI operate at different speeds and require different bus lengths to support a certain number of devices.

STA terms	Bus speed MB/sec. maximum	Bus width bits	Max. bus lengths in meters			Maximum device support
			Single-ended	Differential	LVD	
Fast SCSI	10	8	3	25	NA	8
Fast/WIDE SCSI	20	16	3	25	NA	16
UltraSCSI	20	8	1.5	25	NA	8
Ultra/WIDE SCSI	40	16	NA	25	NA	16
Ultra/WIDE SCSI	40	16	1.5	NA	NA	8
Ultra/WIDE SCSI	40	16	3	NA	NA	4
Ultra2 SCSI	80	16	NA	NA	12	8
Ultra2/WIDE SCSI	80	16	NA	NA	12	16
Ultra160/WIDE SCSI	160	16	NA	NA	12	16
Ultra320 SCSI	320	16	NA	NA	12	16

Connecting SCSI devices to SCSI ports

SCSI ports connect SCSI storage devices to the network. Each SCSI port is totally independent from the other SCSI port.

Each SCSI port is a bus capable of supporting 15 devices and each bus is capable of 40, 80 or 160 MB/sec. (Ultra, Ultra2 or Ultra160) transfer rates.

Each SCSI bus auto-negotiates the appropriate sync rates with the connected devices. If slower devices are mixed with faster devices, the bus communicates at the rate of the slowest device, thus wasting the performance capabilities of the faster devices. Connect slower devices to one SCSI port and connect faster devices to the other port.

The FastStream supports a wide variety of SCSI storage devices including stand-alone drives, removable drives, JBODs, RAIDs, tape, CD and DVD drives, changers and libraries.

1 Connect the cable from the SCSI device to a VHDCI SCSI port on the FastStream VT.
2 Check the type of cable, cable length limit and number of devices recommended for the port. See Exhibit A-1.

   Keep cable lengths as short as possible to ensure the highest signal quality and performance. These cable lengths include the wiring inside the devices.
3 Set the IDs of the SCSI devices connected to the FastStream to a value other than 7.

   Use a sequential ID starting at 0 for each device. The SCSI port has an internal factory setting ID of 7, typical for a SCSI initiator device.
4 Terminate the SCSI bus after the last device. The FastStream VT is terminated internally.

Fibre Channel connections

The Fibre Channel port connects the FastStream VT into either a Fibre Channel Fabric or Fibre Channel Arbitrated Loop.

The FastStream VT uses optical SFP connectors and multimode fiber optic cable.

Make sure all cables are anchored securely at both ends with the proper connectors. Use the shortest possible cable length for best performance.

Cable length	Cable size
Up to 175 meters	62.5 micron
Up to 500 meters	50 micron

Appendix C Designing RAID groups

The ATTO FastStream VT provides instant hardware data protection and intelligence to existing SCSI storage independent of the storage type.

CAUTION

Selecting RAID configuration causes all previous storage data on the drive to be erased. Make sure all of your information is backed up before setting up RAID groups.

The ATTO FastStream VT allows RAID functionality. In general, the process begins with individual drives also called block devices.

Note

If a drive has corrupt or outdated configuration data, that drive cannot be assigned to any RAID group. Ensure all drives to be assigned to RAID groups are configured properly. Refer to Initialize and verify drives on page 7.

A RAID group is a virtual, independent single drive whose data is written to physical drives according to a RAID algorithm. The ATTO FastStream VT supports JBOD, RAID Level 0, RAID Level 1, RAID Level 10 and RAID Level 5.

RAID improves data accessibility and reliability during normal operations, however, you still need a good backup strategy for long-term protection of your data.

JBOD (Just a Bunch of Disks)

JBOD (Just a Bunch of Disks) configuration allows many individual drives to be available for normal storage operations with no special data protection.

Using the ATTO FastStream VT allows you to concatenate several individual drives into one large drive.

A JBOD drive can be constructed as a special case of a RAID group. When multiple physical drives are assigned to a JBOD RAID group, their storage areas appear as a single spanned area of storage. The ATTO FastStream VT supports 1 to 32 drives per JBOD-configured RAID group.

Exhibit A-2 JBOD: Just a Bunch of Disks: no redundancy; each disk is treated independently

JBOD

Disk 0	Disk 1	Disk 2
D0	D4	D8
D1	D5	D9
D2	D6	D10
D3	D7	D11

RAID Level 0

RAID Level 0 (striping) is based on the fact that increased performance can be achieved by simultaneously accessing data across multiple drives, increasing data transfer rates while reducing average access time by overlapping drive seeks. RAID Level 0 groups provide data that is striped across several drives. Drives are accessed alternately, as if stacked one on top of the other.

RAID Level 0 provides no data protection. If one drive fails, all data within that stripe set is lost.

The ATTO FastStream VT supports 2 to 32 drives per RAID Level 0 group.

RAID Level 0 is used by applications requiring high performance for non-critical data.

Exhibit A-3 Exhibit 1.0-2 RAID Level 0, no redundancy

RAID Level 0

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	D5
1	D6	D7	D8	D9	D10	D11
2	D12	D13	D14	D15	D16	D17
3	D18	D19	D20	D21	D22	D23

RAID Level 1

RAID Level 1 ensures the security of data by writing the exact same data simultaneously to two or more different drives. This application is for users with critical data which cannot be lost or corrupted due to the failure of a single drive.

With RAID Level 1, the host sees what it believes to be a single physical drive of a specific size: it does not know about the mirrored pair.

The ATTO FastStream VT manages where data is written and read, allowing one drive to fail without the host knowing it has failed. RAID Level 1 is used in applications containing mission critical data. The ATTO FastStream VT supports an even number of 2 to 32 drives per RAID Level 1 group.

Exhibit A-4 RAID Level 1: Data is written to two or more drives simultaneously.

RAID Level 1

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D4	D4	D8	D8
1	D1	D1	D5	D5	D9	D9
2	D2	D2	D6	D6	D10	D10
3	D3	D3	D7	D7	D11	D11

RAID Level 10

RAID Level 10 increases data transfer rates while ensuring security by writing the exact same data simultaneously to two or more different drives. RAID Level 10 is used in applications requiring high performance and redundancy, combining the attributes of RAID Levels 1 and 0.

The ATTO FastStream VT supports an even number of 4 to 32 drives per RAID Level 10 group.

Exhibit A-5 RAID Level 10 with mirroring and spanning; redundancy is shown in shaded blocks.

RAID Level 10

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D0	D1	D1	D2	D2
1	D3	D3	D4	D4	D5	D5
2	D6	D6	D7	D7	D8	D8
3	D9	D9	D10	D10	D11	D11

RAID Level 5

RAID Level 5 increases reliability while using fewer drives than mirroring by employing parity redundancy. Distributed parity on multiple drives allows you to rebuild a failed drive from the remaining good drives. The ATTO FastStream VT operates in degraded mode if a drive fails.

The ATTO FastStream VT supports 3 to 16 drives per RAID Level 5 group.

Exhibit A-6 RAID Level 5 with parity blocks shaded.

RAID Level 5

Stripe	Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	D0	D1	D2	D3	D4	P0-4
1	D6	D7	D8	D9	P5-9	D5
2	D12	D13	D14	P10-14	D10	D11
3	D18	D19	P15-19	D15	D16	D17
4	D24	P20-24	D20	D21	D22	D23
5	P25-29	D25	D26	D27	D28	D29

Appendix D CLI provides an ASCII-based interface

The command line interface (CLI) uses ASCII commands typed while in CLI mode.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.

Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

The ExpressNAV interface is the preferred method to operate and manage the FastStream VT. Refer to Interface options on page 27 for details.

The command line interface (CLI) is a set of ASCII-based commands which perform configuration and diagnostic tasks. Refer to Interface options on page 27.

- CLI commands are context sensitive and generally follow a standard format

```
[Get|Set] Command [Parameter1|Parameter2]
```

  followed by the **return** or **enter** key
- CLI commands are case insensitive: you may type all upper or all lower case or a mixture. Upper and lower case in this manual and the **help** screen are for clarification only.
- Commands generally have three types of operation: get, set and immediate.
- The get form returns the value of a parameter or setting and is an informational command.
- Responses to get commands are followed by **Ready**.
- The set form is an action that changes the value of a parameter or configuration setting. It may require a **SaveConfiguration** command and a restart of the system before it is implemented. The restart can be accomplished as part of the **SaveConfiguration** command or by using a separate **FirmwareRestart** command. A number of set commands may be issued before the **SaveConfiguration** command.
- Responses to **set** commands are either an error message or **Ready. *.** The asterisk indicates you must use a **SaveConfiguration** command to finalize the **set** command.
- Set commands which do not require a **SaveConfiguration** command, defined as immediate commands, are immediately executed.

Note

Using CLI commands during normal operation can cause a performance drop. Once command actions are complete, performance should return to normal levels.

Exhibit A-7 Symbols, typefaces and abbreviations used to indicate functions and elements of the command line interface used in this manual.

Designation	Indicates
-	a range (6 – 9 = 6, 7, 8, 9)
[ ]	Required entry
\n	end of line
|	pick one of
< >	Optional entry
BlockDevID	index designation of a block device not assigned to any other RAID group; index of a block device provided by the BlockDevScan CLI command
fl	Fibre Channel lun number (0 <= fl <= 31)
fp	Fibre Channel port number (1<= fp <= 2)
GroupName	ASCII name of a RAID group; the name of the RAID group to which the block device is assigned, or blank if the block device is available
Member Index	index designation of a RAID group member
mp1	Ethernet port used to manage the FastStream VT

Designation	Indicates
sb	SCSI bus number (1<= sb <= 2)
sl	SCSI lun ID (0 <= sl <= 7)
st	SCSI target ID (0 <= st <= 15)

CLI error messages

The following error messages may be returned by the Command line Interface

```
ERROR. Invalid Command. Type 'Help' for command list.
ERROR. Wrong/Missing Parameters
Usage: <usage string>
ERROR Invalid RAID Group state
ERROR Invalid Block Device index
ERROR Invalid RAID Member index
ERROR Maximum number of RAID Groups exceeded
ERROR Insufficient number of RAID Group members
ERROR
Block Device at specified index no longer available
ERROR Insufficient RAID Group members for RAID type
```

CLI summary

The following chart summarizes the Command Line Interface commands, their defaults, and an example of how to enter the commands. Commands which have no default values have a blank entry in that column of the table.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician. Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

The ExpressNAV interface is the preferred method to operate and manage the FastStream VT. Refer to Interface options on page 27 for details.

Command	Default	Example
AutoMap		automap
AutoResume	all enabled	set autoresume all disabled
BlockDevClean		blockdevclean 1
BlockDevIdentify		blockdevidentify 1
BlockDevIDStop		blockdevidstop
BlockDevScan		blockdevscan
BridgeModel		get bridgemodel
BridgeName	“ “	set bridgename Omega6
ClearEventLog		cleareventlog
Date	01/01/2000	set date 03/03/03
DefaultInterleave	128	set defaultinterleave 64

Command	Default	Example
DeleteAllMaps		deleteallmaps
DHCPFixedDelay	0	set dhcpfixeddelay 15
DisplayEventLog		displayeventlog
DisplayEventLogFilter	all all all	set displayeventlogfilter gen info all
DriveTest		drivetest begin
DriveTestConfig	not initiated	set drivetestconfig read
DriveTestList		drivetestlist all
DriveTestStatus		get driveteststatus
DumpConfiguration		dumpconfiguration
DumpEventLog		dumpeventlog
EmailFromAddress		set emailfromaddress notify1@attotech.com
EmailNotify	disabled	set emailnotify enabled
EmailNotifyAddress		get emailnotifyaddress
EmailPassword		set emailpassword alpha123
EmailServerAddress	0.0.0.0	get emailserveraddress
EmailUsername		get emailusername
EthernetSpeed	auto	set ethernetspeed 100
EventLog	enabled	set eventlog disabled
EventLogFilter	all all all	set eventlogfilter gen info all
Exit		exit
FCConnMode	loop	set fcconnmode ptp
FCDataRate	auto	get fcdatarate
FCHard	disabled	set fchard disabled
FCHardAddress	fp1=3; fp2=4	set fchardaddress 1 122
FCMultiNode	enabled	set fcmultinode disabled
FCPortErrors		get fcporterrors
FCPortList		fcportlist
FCSCSIBusyStatus	busy	set fcscsibusystatus busy
FCWWName		get fcwwname 1
FirmwareRestart		firmwarerestart
Help		help driveinfo
HSAdd		hsadd 3
HSDisplay		hsdisplay
HSRemove		hsremove 3
IdentifyBridge	disabled	set identifyBridge enabled
Info		info
IPAddress	10.0.0.1	get ipaddress mp1
IPDHCP	enabled	set ipdhcp mp1 disabled
IPGateway	0.0.0.0	get ipgateway mp1
IPSubnetMask	255.255.0.0	get ipsubnetmask mp1
IsReserved		isreserved

Command	Default	Example
MaxOpTemp	70	get maxoptemp
Metrics		metrics display all
MinOpTemp	0	set minoptemp 10
OpTempWarn	5	set optempwarn 15
PartitionDisplay		partitiondisplay alpha1
Password	Password	set password
Performance		get performance 2
Ping		ping 192.42.155.155
RAIDCommandTimeout	30000	raidcommandtimeout 10000
RAIDRebuildPriority	same	set raidrebuildpriority low
Reserve		reserve disabled
ResetFCPortErrors		resetfcporterrors 1
RestoreConfiguration		restoreconfiguration default
RGAddStorage		rgaddstorage g1 span commit
RGCancelAddStorage		rgcanceladdstorage g1
RGCommit		rgcommit all
RGCreate		rgcreate g1
RGDelete		rgdelete g1
RGDisplay		rgdisplay all
RGHaltConversion		rghaltconversion g1
RGHaltRebuild		rghaltrebuild g1
RGMemberAdd		rgmemberadd g1 22
RGMemberRemove		rgmemberremove g1 22
RGRebuild		rgrebuild g1
RGResumeConversion		rgresumeconversion g1
RGResumeRebuild		rgresumerebuild g1
RGSpanDepth	1	set rgspandepth g1 22
RGSpeedRead	disabled	set rgspeedread enabled
RGWaitTimeout	5	rgwaittimeout 30
RMState		set rmstate g1 online
RMStatus		rmstatus g1
Route		route 1 0 raid alpha1 6 bridge
RouteDisplay		routedisplay SCSI
SaveConfiguration		saveconfiguration restart
SCSIDomainValidation		scsidomainvalidation
SCSIInitId	0x07	set scsiinitid 2 12
SCSIPortBusSpeed	ultra320	set scsiportbusspeed 2 ultra160
SCSIPortList		scsiportlist
SCSIPortReset		scsiportreset 1
SCSIPortResetOnStartup	enabled	set scsiportresetonstartup 1 disabled
SCSIPortSyncTransfer	enabled	set scsiportsynctransfer 2 disabled

Command	Default	Example
SCSIPortTermination	enabled	set scsiporttermination 1 enabled
SCSIPortWideTransfer	enabled	set scsiportwidetransfer 2 disabled
SCSITargetLUNs	8	set scsitargetluns 1 64
SCSITargets		scsitargets 1
SerialNumber		get serialnumber
SerialPortBaudRate	115200	set serialportbaudrate 19200
SerialPortEcho	enabled	get seriallportecho
SNTP	enabled	get sntp
SNTPServer	192.43.244.18	set sntpserver 129.6.15.28
TailEventLog		taileventlog
TapeLibDelete		tapelibdelete barb2
TapeLibInfo		tapelibinfo barb1
TapeWriteProtect	disabled	tapewriteprotect all enabled
Temperature		get temperature
Time	00:00:00	set time 03:32:30
TimeZone	EST	set timezone pst
Username	root	set username Barbara
VerboseMode	enabled	set verbosemode disabled
Voltage		get voltage
VTLCapInfoNotify	75	set vtlcapinfonotify 65
VTLCapWarnNotify	90	set vtlcapwarnnotify 85
WrapEventLog	enabled	set wrapeventlog disabled
zModem		zmodem receive

CLI command explanations

Command Line Interface commands are listed alphabetically with explanations of what they are used for, their defaults and syntax.

CAUTION

Do not use CLI unless you are directed to by an ATTO technician.

Changing parameters may cause loss of data and/or disruption to performance and reliability of the FastStream.

The ExpressNAV interface is the preferred method to operate and manage the FastStream VT. Refer to Interface options on page 27 for details

AutoMap

Automap automatically maps a subset of target devices visible to the firmware. All previous maps are deleted.

If FCMultiNode is enabled: AutoMap [fp]
SaveConfiguration command required
If FCMultiNode is disabled: AutoMap

AutoResume

*Regulates the automatic continue feature for interrupted operations at startup. If enabled, all interrupted operations are continued at startup. If no **GroupName** is specified, all existing RAID groups are affected.*

Default: all enabled
set AutoResume Rebuild [enabled | disabled]
<GroupName>

BlockDevClean

Removes any ATTO configuration data from the block device with the specified BlockDevID.

BlockDevClean [BlockDevID]

WARNING

All RAID group setup information and RAID group data is lost if you use the BlockDevClean command.

BlockDevIdentify

Causes the I/O LED of the drive to illuminate for one minute if it is accessible through the SCSI port

CAUTION

The BlockDevIdentify command is intended for diagnostic purposes only.

Executing this command may adversely impact the performance and throughput of the FastStream for the time that the LED is illuminated.

BlockDevIdentify <GroupName> [BlockDevID | Member Index]

BlockDevIDStop

Turns off the IO LED of a previously identified disk drive.

BlockDevIDStop

BlockDevScan

*Lists all currently connected physical drives along with any potential RAID group association. Each block device listed is assigned a unique index at the time of the scan to identify drives for other CLI operations. Include the **flush** parameter to force discovery of all block devices. The **flush** parameter also forces existing RAID groups offline until member block devices are discovered.*

BlockDevScan <flush>

BridgeModel

Reports model information about the FastStream.

get BridgeModel

BridgeName

Allows you to specify an eight-character name to an individual FastStream unit. It is not the World Wide Name. The string is alphanumeric, eight characters long,.

Default: ""
set BridgeName [name]
get BridgeName

ClearEventLog

Clears the contents of the event log. No new entries are recorded until the command has completed.

ClearEventLog

Date

Regulates the current date for this unit. The possible date range is 1/1/2000 to 12/31/2099.

Default: 01/01/2000
set Date [MM] /.[DD]/ [YYYY]
get Date

DefaultInterleave

Assigns or retrieves the system-default interleave size for new RAID groups. If an interleave size is not explicitly specified when a RAID group is created, then the ***DefaultInterleave*** *value is used instead.*

Default: 128
set DefaultInterleave [16 | 32 | 64 | 128 | 256]
get DefaultInterleave

DeleteAllMaps

Removes all mapped devices from the map table. Upon the subsequent POST, the default maps are loaded if no maps are present.

DeleteAllMaps
SaveConfiguration command required

DHCPFixedDelay

Selects/displays the delay, in seconds, between DHCP client request intervals, from between 0 seconds to 255 seconds. 0 time is typical.

Default: 0 (no delay)
set DHCPFixedDelay [0 - 255]
Requires a SaveConfiguration command
get DHCPFixedDelay

DisplayEventLog

Displays the EventLog .The event log may be filtered using the DisplayEventLogFilter command. The optional parameter ***n*** *is the number of lines to be displayed as a single page with no user interaction. After the command has executed, use* ***+, -*** *or = to scroll through the log. Type* ***quit*** *and press* ***Enter*** *to exit the command.*

DisplayEventLog <n>

DisplayEventLogFilter

Filters the display of data for specified subsystems and levels during DisplayEventLog mode. Valid event log subsystem entries are platform-dependent. For set commands, the final parameter indicates whether or not events from the specified subsystem and level is displayed.

Default: all all all
set DisplayEventLogFilter [subsystem | all] [level | all] [all | none]
Requires a SaveConfiguration command
get DisplayEventLogFilter [subsystem | all] [level | all]

DriveTest

Starts or stops a drive test with a previously specified configuration and drive list (refer to DriveTestConfig and DriveTestList).Drives which are in-use by the test are not available for RAID configuration or RAID operations. Only one test can be run at a time. Drives to be tested cannot be part of a RAID group or in use as Hot Spares.

DriveTest [Begin | Cancel]

DriveTestConfig

Configures the next drive test to perform one of the following operations: initialize (destructive write-only), read (non-destructive read-only), verify (destructive verify), or init-verify (destructive write-read-verify).The test is not started until the DriveTest ***Begin*** *command is given. Drives to be tested cannot be part of a RAID group or in use as Hot Spares.*

Default: not initiated
set DriveTestConfig [init | read | verify | init-verify]
get DriveTestConfig

DriveTestList

Specifies drives to be run in the next drive test of drives which are not part of a RAID group or which are Hot Spares. The ***all*** *parameter automatically chooses eligible drives. The test is not started until the DriveTest* ***Begin*** *command is given.*

set DriveTestList [drive [BlockDevID] | all]
get DriveTestList

DriveTestStatus

Displays the status of the currently running drive test but does not display performance metrics. If a block device ID is not running or cannot be found, its state is ***idle*** *and percent complete is* ***0.***

get DriveTestStatus <drive [BlockDevID]>

DumpConfiguration

Displays the unit's configuration to a current CLI session.

DumpConfiguration

DumpEventLog

Displays the contents of the entire event log to the current CLI session without impact on the log itself (the log is not cleared). No events are recorded until the command has been completed.

DumpEventLog

EmailFromAddress

Configures the E-mail address that the FastStream uses to talk to the E-mail server. Full E-mail address is a fully qualified Internet E-mail address, with no more than 128 characters.

set EmailFromAddress [full email address]
get EmailFromAddress

EmailNotify

Regulates E-mail notification.

Default: disabled.
set EmailNotify [enabled | disabled]
Requires a SaveConfiguration command
get EmailNotify

EmailNotifyAddress

Configures notification addresses using an index (a number between 1 and 5, inclusive), the full E-mail address of the recipient, a fully qualified Internet E-mail address not more than 128 characters long, and a level.

Levels are
None: no E-mails sent.
Critical: critical event notification.
Warning: warnings and critical event notification.
Informational: information notification
All: all warnings, critical events, informational notices
set EmailNotifyAddress [index] [full email address] [warning level]
get EMailNotifyAddress

EmailPassword

Configures the password used to authenticate the login to the SMTP E-mail server. The password must not be more than 64 characters. A password is not required if the E-mail server does not require authentication.

set EmailPassword
Requires a SaveConfiguration command

EmailServerAddress

Configures the address of the server that the FastStream should contact in order to send E-mails.

Default: 0.0.0.0
set EmailServerAddress [IP address]
Requires a SaveConfiguration command
get EmailServerAddress

EmailUsername

Configures the user name used to authenticate the login to the SMTP E-mail server. The user name must not be more than 128 characters. A user name is not required if the E-mail server does not require authentication.

set EmailUsername [user name]
Requires a SaveConfiguration command
get EmailUsername

EthernetSpeed

*Sets/displays the current speed of the Ethernet connection. Choices are **10, 100**, and **Auto**.*

Default: auto
set EthernetSpeed [mp1] [10 | 100 | Auto]
Requires a SaveConfiguration Restart command
get EthernetSpeed [mp1]

EventLog

When enabled, records various system errors to the event log.

Default: enabled
set EventLog [enabled | disabled]
get EventLog

EventLogFilter

Filters data from specific unit subsystems and levels when event logging is enabled. The specific entries supported are platform-dependent.

Default: all all all
set EventLogFilter [subsys | all] [event level | all] [all | none]
get EventLogFilter [subsystem | all] [level | all]

Exit

Ends the current Ethernet telnet CLI session; it has no effect if used during a serial CLI session.

Exit

FCConnMode

*Controls/reports the connection mode the FastStream uses when communication across a FC network, either to a Fibre Channel Arbitrated Loop (FC-AL) when you select **loop** mode, or point-to-point when you choose **ptp**. If you choose **loop-ptp** or **ptp-loop**, the FastStream tries to use the first parameter first.*

Default: loop
set FCConnMode [fp] [loop | ptp | loop-ptp | ptp-loop]
Requires a SaveConfiguration Restart command
get FCConnMode [fp | all]

FCDataRate

Specifies the rate the FastStream uses, 1 Gigabit/sec., 2 Gigabit/sec. 4 Gigabit/sec. or auto negotiate.

Default: auto
set FCDataRate [fp |all] [1Gb | 2Gb | 4Gb | auto]
Requires a SaveConfiguration Restart command
get FCDataRate [fp | all]

FCHard

Used to enable or disable FC hard address assignment. Under soft addressing, the FastStream loop address is assigned during loop initialization.If you enable hard addressing use ***FCHardAddress*** *(described below).*

Default: disabled
set FCHard [enabled | disabled]
Requires a SaveConfiguration Restart command
get FCHard

FCHardAddress

Sets/displays the value used as the FC-AL hard address. This hexadecimal value represents the address the FastStream tries to use if hard addressing is enabled. When an address is not set, the current value is displayed. The valid range of values is 0 through 125.

Default fp1=3; fp2=4
set FCHard Address [fp | [address]]
Requires a SaveConfiguration Restart command
get FCHardAddress [fp | all]

FCMultiNode

When enabled (multi node), each port reports a separate unique Node Name and logical units may be mapped to any port. When disabled (single node), each port reports the same Node Name and each logical unit map is applied to all ports.

Note

Changing the state of this parameter deletes all existing maps. Add new maps using the AutoMap or Route commands.

Default: disabled
set FCMultiNode [enabled | disabled]
Requires a SaveConfiguration command
get FCMultiNode

FCPortErrors

Displays the number of Fibre Channel errors that have occurred since the last reboot/power-on or use of the ResetFCPortErrors command.

get FCPortErrors

FCPortList

Returns a list of available FC ports and their current status. Valid status values are ***Up, Down, Failed, Reserved*** *and* ***Disabled.***

FCPortList

FCSCSIBusyStatus

Chooses to report ***BUSY*** *or* ***QUEUE FULL*** *when a unit is unable to accept a SCSI command.*

Default: busy
set FCSCSIBusyStatus [busy | qfull]
Requires a SaveConfiguration command
get FCSCSIBusyStatus

FCWWName

Reports the Word Wide Name (WWN) of the FC interface. Each FC port has an individual and unique WWN. The least significant 3 bytes of the WWN are used as the Ethernet MAC address. The lower nibble of the highest byte designates the port number.

get FCWWN [fp | all]

FirmwareRestart

Resets and reinitializes the unit firmware. Use the ***forced*** *option to override any CLI reservations held by other sessions.*

FirmwareRestart <forced>

Help

Displays a list of available commands. If command name is specified, displays detailed command-specific information.

Help <command name>

HSAdd

Assigns a block device to the Hot Spare pool.

HSAdd [BlockDevID]

HSDisplay

Lists all devices in the Hot Spare pool.

HSDisplay

HSRemove

Removes a block device from the Hot Spare pool

HSRemove [BlockDevID]

IdentifyBridge

Enabling this option causes the front panel Ready LED of the FastStream to blink until the parameter is disabled.

Default: disabled
set IdentifyBridge [enabled | disabled]
get IdentifyBridge

Info

Displays version numbers and other production information for key components.

Info

IPAddress

Regulates the current FastStream IP address.If IPDHCP is enabled (see below), ***get*** *command reports the current IP address assigned by the network DHCP server.*

Default IP Address: 10.0.0.1
set IPAddress [mp1] xxx.xxx.xxx.xxx
Requires a SaveConfiguration Restart command
get IPAddress [mp1]

IPDHCP

Selecting DHCP allows the FastStream to request an IP address from the network. The network must have at least one DHCP server.

Default: enabled
set IPDHCP [mp1] [enabled | disabled]
Requires a SaveConfiguration Restart command
get IPDHCP [mp1]

IPGateway

Controls the current default gateways used by the Ethernet port on the unit. If IPDHCP is enabled, the ***get*** *command reports the current IP gateway assigned by the network DHCP server.*

Default: 0.0.0.0
set IPGateway [mp1] [xxx.xxx.xxx.xxx]
Requires a SaveConfiguration Restart command
get IPGateway [mp1]

IPSubnetMask

Sets/displays the current subnet mask. If IPDHCP is enabled, ***get*** *command reports current subnet mask assigned by DHCP server.*

Default: 255.255.0.0
set IPSubnetMask xxx.xxx.xxx.xxx
Requires a SaveConfiguration Restart command
get IPSubnetMask

IsReserved

Displays the reservation status of the FastStream.

IsReserved

MaxOpTemp

Regulates the maximum operating temperature of this unit in degrees Celsius. Valid entries are between 55 °C and 70 °C.

Default: 70
set MaxOpTemp [55 – 70]
Requires a SaveConfiguration Restart command
get MaxOpTemp

Metrics

Controls the collection of standard data metrics within a product via the command's ***Start, Stop*** *and* ***Display*** *parameters.*

Metrics [Start | Stop | Display| Clear] [drive [BlockDevID] | all | running]

MinOpTemp

Regulates the minimum operating temperature of this unit in degrees Celsius. Valid entries are between 0 °C and 15 °C.

Default: 0
set MinOpTemp [0 – 15]
Requires a SaveConfiguration Restart command
get MinOpTemp

OpTempWarn

Regulates the number of degrees Celsius before a thermal control event precipitates a warning to the user. Valid entries are between 0 °C and 15 °C.

Default: 0
set OpTempWarn [0 – 15]
Requires a SaveConfiguration Restart command
get OpTempWarn

PartitionDisplay

Lists all the partitions available in the specified RAID group. The partitions are listed in order of contiguousness (as opposed to index order).

PartitionDisplay [GroupName]

Password

Specifies password for all non-serial sessions: Telnet, ftp and FastStream browser-based user interface. You are prompted for the current password, to type the new password, and to confirm the new password. If local ***echo*** *is enabled, password echoes all* ******* *characters. In verbose mode only, CLI requests the password be re-typed. When the password is all* ***0****s, Telnet and ftp do not validate the password and MD5 authentication is disabled. Passwords are case sensitive and can be 1-32 characters long with no spaces.*

Default: Password
set Password
Requires a SaveConfiguration command

Performance

Returns the performance data for the FC port you specify. Data includes the average rate (MB per sec.) and number of I/Os measured over the previous sampling period where a sampling period is approximately one second. Successful SCSI Read (08h, 28h) and Write (Oah, 2Ah) commands are considered I/Os.Reported performance may be affected by FC port and SCSI bus availability and saturation, SCSI device speeds and overall system use.

get Performance <fp>

Ping

Sends an ICMP echo request to the specified host.

ping [mp1] [xxx.xxx.xxx.xxx] <count <size>>

RAIDCommandTimeout

Specifies in milliseconds the range of time the drives have to respond. You must use ***RGCommit*** *before using this command.*

CAUTION

If you set this value too low, failures may occur during normal operation.

Default: 30000
set RAIDCommandTimeout [100 - 3600000]
Requires a SaveConfiguration Restart command
get RAIDCommandTimeout

RAIDRebuildPriority

Sets or displays the RAID rebuild priority. A RAID rebuild priority set to ***high*** *gives higher priority to RAID rebuilds and lower priority to the processing of simultaneous I/O transactions. A RAID rebuild priority set to* ***low*** *gives lower priority to the rebuild and a higher priority to I/O transactions. Set* ***same,*** *the RAID rebuild and processing of I/O transactions is the same.*

Default: same
set RAIDRebuildPriority [high | low | same]
Requires a SaveConfiguration command
get RAIDRebuildPriority

Reserve

Reports the state of CLI reservation for the current CLI session. If the command reports that Reservations are enabled, then another CLI session has control of parameter modification on the unit.

Reserve

ResetFCPortErrors

ResetFCPortErrors resets all Fibre Channel error counts for the specified port to zero. Refer to FCPortErrors .

ResetFCPortErrors [fp] [all]

RestoreConfiguration

Issued with the ***default*** *option, forces the unit NVRAM settings to their original defaults. The* ***saved*** *option undoes any changes made to this session since the last save.*

RestoreConfiguration < Default | Saved >

RGAddStorage

Adds additional storage to an existing RAID group. ***Mirror|Stripe|Span*** *specifies the method used to expand the storage. Optional parameter BlockDevID specifies available block device(s) to be added to the RAID group. Optional parameter* ***commit*** *specifies that the RGCommit command is run automatically.*

Note

Mirrors cannot be added to a RAID 5 group.

RGAddStorage [GroupName] [Mirror | Stripe | Span]
<BlockDevID> <commit>

RGCancelAddStorage

Cancels the RGAddStorage command.

RGCancelAddStorage [GroupName]

RGCommit

*Stamps a new RAID group's configuration to its member drives. After this command, a RAID group can be considered operational and transitions from the new state to online, degraded or offline depending on the health of the selected member drives. Also stamps an existing RAID group's configuration to its member drives when the existing RAID group is in the process of having storage added. If the **init** option is specified, previous user configuration information is erased from each new member drive.*

RGCommit <GroupName <init> | all] <init> >

RGCreate

Creates a new empty RAID group. The optional value after the RAID group type parameter represents the desired interleave for the RAID group. If this value is not provided then the system-default interleave size is used.

RGCreate [GroupName] [RAID [0 | 1 | 10 | 5] | JBOD] <16 | 32 | 64 | 128 | 256 | 512 | 1024 | 2048>

RGDelete

*Deletes the specified RAID group. If **All** is used, the command deletes all existing RAID groups that do not have mapped Virtual drives. Any commands outstanding to the RAID group when this command is issued are completed before deleting the RAID group. A successful delete clears the configuration area of the member drives. If you have enabled verbose mode, you are asked to confirm the delete.*

RGDelete [GroupName | All]

RGDisplay

*Displays status information for a single RAID group, or if **All** is used, all available RAID groups.*

RGDisplay < GroupName | All >

RGHaltConversion

Stops the conversion on the specified existing RAID group.

RGHaltConversion [GroupName]

RGHaltRebuild

Stops the rebuild(s) on the specified existing RAID group. If no Member Index is specified, all rebuilds on that RAID group are stopped.

RGHaltRebuild [GroupName] <Member Index>

RGMemberAdd

*Adds up to 10 available block devices to a new RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the new state, or if the specified block device index does not represent an available device. If **all** is specified, then all available block devices are added to the RAID group until the maximum number of RAID group members has been met. The command resets the number of RAID group partitions to 1.*

RGMemberAdd [GroupName] [all | BlockDevID]

RGMemberRemove

Removes a RAID member from a new RAID group. This command fails if the specified RAID group does not exist, if the specified RAID group is not in the new state, or if the specified block device index does not represent an available device. The command resets the number of RAID group partitions to 1.

RGMemberRemove [GroupName] [BlockDevID]

RGRebuild

*Starts rebuilding the specified existing RAID group. Optional parameter **Member Index** specifies the member to rebuild. If no member is specified, all degraded members are rebuilt. Optional parameter **BlockDevID** allows an available block device to be substituted for the RAID member currently assigned to the Member Index.*

RGRebuild [GroupName] <Member Index> <BlockDevID>

RGResumeConversion

Continues the stopped conversion on the specified existing RAID group.

RGResumeConversion [GroupName]

RGResumeRebuild

Continues the rebuild(s) on the specified existing RAID group. If no Member Index is specified, all stopped rebuilds on that RAID group are continued.

RGResumeRebuild [GroupName] <Member Index>

RGSpanDepth

Sets the span depth on the specified existing RAID group. The RAID group must be RAID Level 0, RAID Level 1, RAID Level 5, or RAID Level 10.

Default: 1
set RGSpanDepth [GroupName] [Span Depth [1-32]]
get RGSpanDepth [GroupName]

RGSpeedRead

*Performs look-ahead during reads from RAID group member disks for **all** or the specified RAID group.*

Default: all disabled
set RGSpeedRead [GroupName | all] [enabled | disabled]
get RGSpeedRead [GroupName | all]

RGWaitTimeout

Specifies the maximum time in seconds that the system waits to discover previously-configured RAID groups attached to the drive. The timeout is used during system boot time and when the BlockDevScan command is issued.

Default: 5
set RGWaitTimeout [1-3600]
Requires a SaveConfiguration Restart command
get RGWaitTimeout

RMState

Regulates the state on the specified existing RAID group member(s). If no Member Index is specified, the status of all members of the specified RAID group is set.

Note

Members undergoing rebuild are not changed. Rebuilds on these members must first be stopped.

set RMState [GroupName] <Member Index> [Online | Degraded | Unavailable | Faulted]

RMStatus

Displays the status of all RAID members within the specified RAID group or a specific RAID member (if specified) within a RAID group.

RMStatus [GroupName] <Member Index>

Route

*Assigns a host protocol address to a target destination device. More than one FC LUN may be assigned to a partition. If you try to map a new partition to the same FC LUN, the previous map is overwritten.Use the **Delete** identifier to remove the map. In verbose mode, overwriting a map requires secondary confirmation of the action.*

Route FC [fp] [lun] [[RAID [GroupName] [Partition Index]] [Bridge | Delete]

RouteDisplay

Displays a combined list of host protocol address to target destination device mappings.

RouteDisplay FC <fp> <lun>

SaveConfiguration

*Issued with the **restart** option, cycles unit power after saving configuration changes. The **norestart** option saves changes without restarting.*

Note

Certain modifications require a system restart.

SaveConfiguration <Restart | NoRestart>

SCSIDomainValidation

Runs Domain Validation tests on the SCSI system which may detect problems with SCSI cables, termination or damaged transceivers. Tape drives attached to the FastStream should be loaded with media. The media is not overwritten. Reboot the FastStream after running the test.

SCSIDomainValidation

SCSIInitID

*Specifies or reports the SCSI initiator ID on the specified SCSI port as found in NVRAM. All maps coinciding with the user-specified **SCSIInitID** are destroyed after the command is issued.*

Default: 7
set SCSIInitID [sb [0-15]]
get SCSIInitID

SCSIPortBusSpeed

Controls the transfer rate at which the unit attempts to negotiate with its SCSI devices.

Default: ultra320
set SCSIPortBusSpeed [sb] [fast | ultra | ultra2 | ultra160 | ultra320]
get SCSIPortBusSpeed [sb]

SCSIPortList

Lists available SCSI ports and their current status.

SCSIPortList

SCSIPortReset

Resets the specified SCSI bus.

SCSIPortReset [sb]

SCSIPortResetOnStartup

Specifies if the SCSI port should be reset on power-up.

Default: enabled
set SCSIPortResetOnStartup [sb] [enabled | disabled]
Requires a SaveConfiguration command
get SCSIPortResetOnStartup [sb]

SCSIPortSyncTransfer

Specifies whether synchronous SCSI transfers should be negotiated with devices on the specified SCSI port.

Default: enabled
set SCSIPortSyncTransfer [sb] [enabled | disabled]
Requires a SaveConfiguration command
get SCSIPortSyncTransfer [sb]

SCSIPortTermination

Configures/reports the SCSI internal termination of the SCSI port identified on the FastStream.

Default: enabled
set SCSIPortTermination [sb] [enabled | disabled]
Requires a SaveConfiguration command
get SCSIPortTermination [sb]

SCSIPortWideTransfer

Specifies whether wide SCSI transfers should be negotiated. ***Enabled*** *allows wide transfer negotiation*

Default: enabled
set SCSIPortWideTransfer [sb] [enabled | disabled]
Requires a SaveConfiguration command
get SCSIPortWideTransfer

SCSITargetLUNs

Sets the maximum number of SCSI LUNs per target the FastStream tries to query during a SCSI bus scan.

Default: 8
set SCSITargetLUNs [sb] [8 | 64]
Requires a SaveConfiguration command
get SCSITargetLUNs

SCSITargets

Lists SCSI devices connected and operating on the referenced SCSI port with SCSI target number, SCSI LUN number, device type, vendor ID, product ID, revision and serial number.

SCSITargets [sb]

SerialNumber

Reports the FastStream serial number which is unique for each FastStream. The serial number tracks the board throughout its life and should not be changed.

get SerialNumber

SerialPortBaudRate

Configures the baud rate for the unit's RS-232 serial port. The number of data bits is fixed at ***8*** *with no parity.*

Default: 115200
set SerialPortBaudRate [9600 | 19200 | 38400 | 57600 | 115200]
Requires a SaveConfiguration Restart command
get SerialPortBaudRate

SerialPortEcho

Controls if the unit echoes characters on its RS-232 port. When enabled, all non-control character keyboard input is output to the display.

Default: enabled
set SerialPortEcho [enabled | disabled]
get SerialPortEcho

SNTP

Controls whether an SNTP time server is used to set the FastStream time.

Default: enabled
set SNTP [enabled | disabled]
Requires a SaveConfiguration Restart command
get SNTP

SNTPServer

Controls or displays the main IP address the client uses to retrieve the SNTP time.

Default: 192.43.244.18
set SNTPServer[xxx.xxx.xxx.xxx]
Requires a SaveConfiguration Restart command
get SNTPServer

TailEventLog

Displays new events to the terminal. Type ***quit*** *and press* ***Enter*** *to exit tail mode.*

TailEventLog

TapeLibDelete

Deletes the specified tape library or all tape libraries.

TapeLibDelete [GroupName | all]

TapeLibInfo

Lists information for the specified tape library or all tape libraries.

TapeLibInfo [LibName | all]

TapeWriteProtect

Controls write protection for a particular virtual tape or both virtual tapes.

set TapeWriteProtect [Tape Vol ID | all] [enabled | disabled]
get TapeWriteProtect

Temperature

Displays the current internal operating temperature of this unit in degrees Celsius.

get Temperature

Time

Controls or displays the current time as clocked by the unit in 24 hour format. Time cannot be set if SNTP is enabled.

set Time [HH: MM: SS]
get Time

TimeZone

Controls or displays the time zone or an offset from GMT for the unit.

set TimeZone [[EST | CST | MST | PST] | [+/-HH:MM]]
Requires a SaveConfiguration command
get TimeZone

Username

Specifies the user name used for all sessions: NDMP, Telnet, FTP and ExpressNAV. ***Username*** *is case insensitive, 1 to 32 characters, and cannot contain spaces.*

Default: root
set Username [user name]
Requires a SaveConfiguration command
get Username

VerboseMode

Controls the level of detail in CLI Help output and command response output for the current CLI session.

Default: enabled
set VerboseMode [enabled | disabled]
get VerboseMode

Voltage

Displays the voltage levels monitored by the FastStream.

Representations of the voltages are
VDDA: +3.31 V
VDDB: +2.49 V
VDDC: +1.5V
VDDD: +1.35V
ALL: all monitored voltages
get Voltage [VDDA |VDDB |VDDC VDDD | all]

VTLCapInfoNotify

Specifies what percentage of total storage capacity used triggers an informational level notification is sent to the user. The valid range is 50 percent to 75 percent.

Default:75
set VTLCapInfoNotify [percentage]
get VTLCapInfoNotify

VTLCapWarnNotify

Specifies what percentage of total storage capacity used triggers a warning notification is sent to the user. The valid range is 75 percent to 90 percent.

Default: 90
set VTLCapWarnNotify [percentage]
get VTLCapWarnNotify

WrapEventLog

When enabled, the FastStream logs up to 2,048 event entries before wrapping (overwriting the first entries). If disabled, the FastStream stops logging event entries when the buffer is full.

Default: enabled
set WrapEventLog [enabled | disabled]
Requires a SaveConfiguration command
get WrapEventLog

zModem

Uses the zMODEM protocol to transfer a file to or from the unit via the RS-232 port. The filename to retrieve is required if the ***send*** *option is specified.*

Zmodem [send [filename] | receive]

Appendix E Standards and compliances

The equipment described in this manual generates and uses radio frequency energy. If this equipment is not used in strict accordance with the manufacturer's instruction, it can and may cause interference with radio and television reception. See the ATTO FastStream VT 5300 Technical Specification sheet for your particular model for a full list of certifications for that model.

FCC Standards: Radio and Television Interference

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to FCC rules Title 47 of the CFR, Part 15, Subpart B which are designed to provide a reasonable protection against such interference when operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, try to correct the interference by one or more of the following measures:

- Move the receiving antenna.
- Relocate the FastStream VT 5300 with respect to the receiver, or move the FastStream VT 5300 away from the receiver.
- Plug the computer into a different outlet so the computer and receiver are on different branch circuits.
- If necessary, consult an ATTO authorized dealer, ATTO Technical Support Staff, or an experienced radio/television technician for additional suggestions.

The booklet *How to Identify and Resolve Radio/TV Interference Problems* prepared by the Federal Communications Commission is a helpful guide. It is available from the US Government printing office, Washington, DC 20402, Stock No. 004-000-00345-4.

MET

Listed with MET UL 60950-1/CSA C22.2 No. 60950-1.

Canadian Standards

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Standards

Declaration of Conformity

This following statement applies to the ATTO FastStream VT 5300.

This device has been tested in the basic operating configuration and found to be compliant with the following European Union standards:

Application of Council Directive: 89/336/EEC

Standard(s) to which conformity is declared: EN55022, EN50082-1, EN60950

This Declaration will only be valid when this product is used in conjunction with other CE approved devices and when the entire system is tested to the applicable CE standards and found to be compliant.

The ATTO FastStream VT 5300 complies with Directive 2002/95/EC on the Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS).

Appendix F Warranty, contact information

Manufacturer limited warranty

Manufacturer warrants to the original purchaser of this product that it is free from defects in material and workmanship as described in the ATTO Technology website, **www.attotech.com.** Manufacturer liability shall be limited to replacing or repairing, at its option, any defective product. There is no charge for parts or labor should Manufacturer determine that this product is defective.

Products which have been subject to abuse, misuse, alteration, neglected, or have been serviced, repaired or installed by unauthorized personnel shall not be covered under this warranty provision. Damage resulting from incorrect connection or an inappropriate application of this product shall not be the responsibility of Manufacturer. Manufacturer's liability is limited to Manufacturer's product(s); damage to other equipment connected to Manufacturer's product(s) is the customer's responsibility.

This warranty is made in lieu of any other warranty, express or implied. Manufacturer disclaims any implied warranties of merchantability or fitness for a particular purpose. Manufacturer's responsibility to repair or replace a defective product is the sole and exclusive remedy provided to the customer for breech of this warranty. Manufacturer is not liable for any indirect, special, incidental, or consequential damages irrespective of whether Manufacturer has advance notice of the possibility of such damages. No Manufacturer dealer, agent or employee is authorized to make any modification, extension or addition to this warranty.

Contact ATTO Technology, Inc.

Customer service, sales and technical support are available by phone Monday through Friday, 8 a.m. to 5 p.m EST., or by fax and website 24-hours a day.

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(716) 691-1999 • voice
(716) 691-9353 • fax
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ATTO Technology can also be reached via e-mail at the following addresses:

Sales Support: sls@attotech.com
Technical Support: techsupp@attotech.com